Mesoz. Fossils

QE
807
A5W953
1878
Moll.

49365
Smith

London, Palaeontographical Society
(Monographs).

Wright, Thomas
Monograph on the Lias Ammonites of the British Islands.

Atlas.

1878-86

Smithsonian Institution
242359
National Museum

PLATE I.

Zone of Arietites Bucklandi.

Fig. 1. Arietites Bucklandi, *Sowerby*. Lateral view. Half natural size. From the Ironstone beds at Scunthorpe, north-west Lincolnshire. My collection.

2. Front view of the same Ammonite.

3. Enlarged figure of the foliations of the septa.

4. Arietites semicostatus, *Young and Bird.* = Arietites geometricus, *Oppel.* Lateral view. Natural size. My collection.

5. View of the siphonal area, showing the compressed sides and angular keel.

6. Enlarged figure of the foliations of *A. semicostatus.*

7. Young shell, smooth like *A. planorbis;* being the four inner whorls of A. semicostatus. My collection.

8. Young shell, in which ribs are developed in early life. My collection.

Fig. 1.

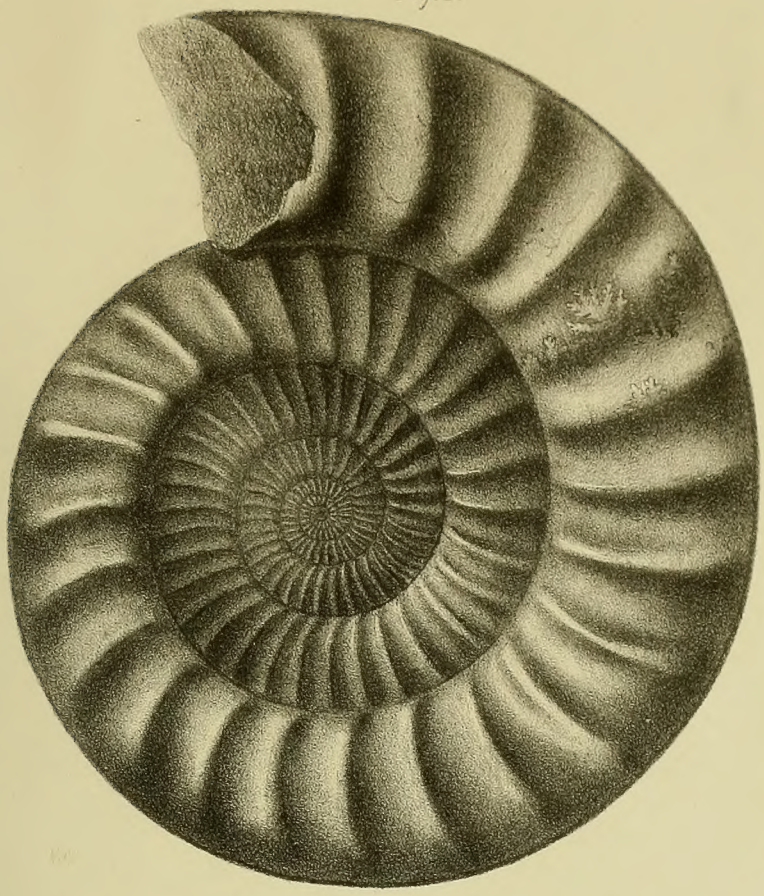


Fig. 2.

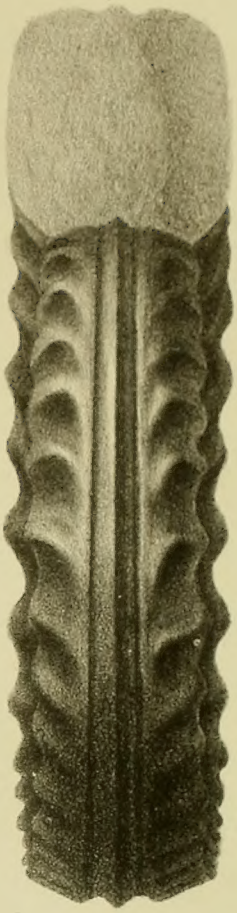


Fig. 3.

Fig. 4.

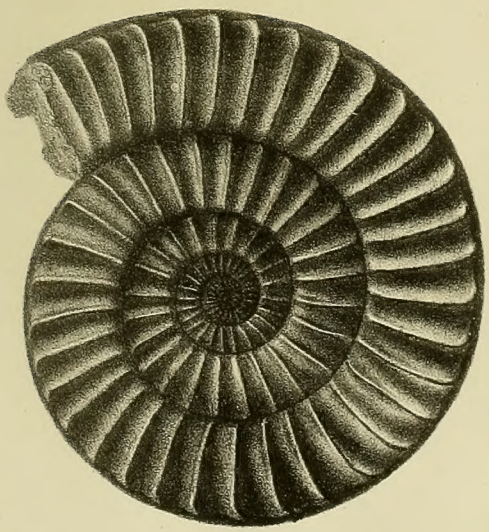


Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

A.Gawan lith.

Hanhart imp.

PLATE II.

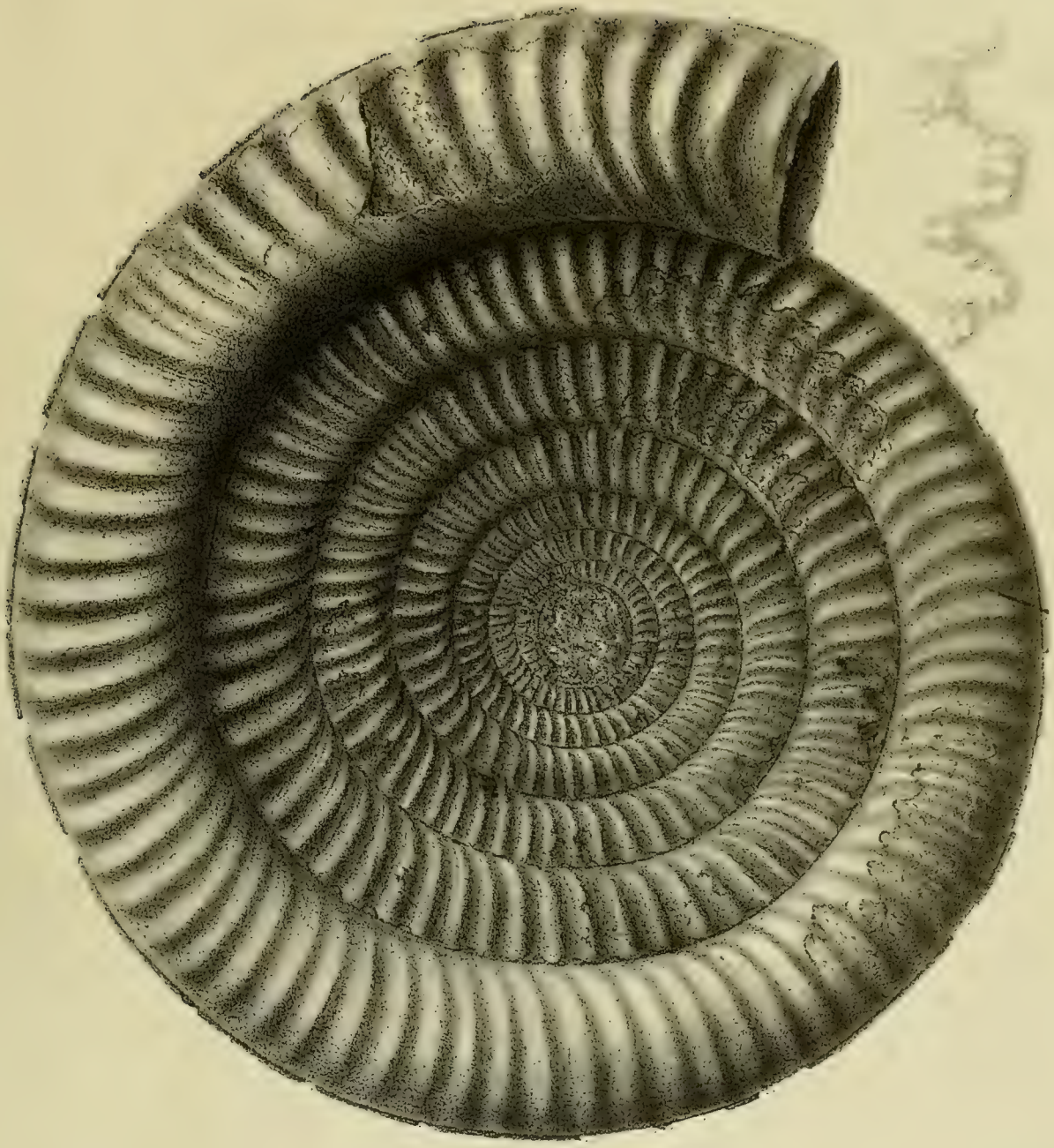
Zone of Arietites Bucklandi.

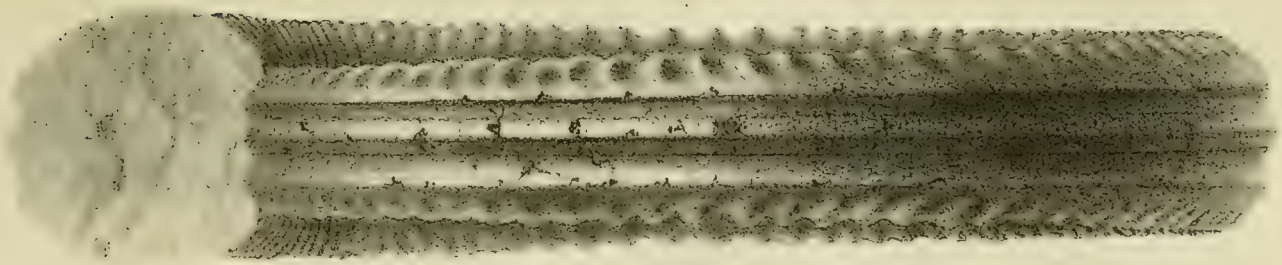
Fig. 1. Arietites Conybeari, *Sowerby*. Lateral view. Half natural size. My collection.

2. Front view of the same Ammonite, showing siphonal area and bisulcations, in same proportion.

3. Foliations of the septa magnified.

This fine type shell was obtained from the Great Western Railway cutting at Saltford near Bath when the line was making. A magnificent specimen of this species, nearly as large as a small carriage wheel, from the same locality, collected by me, is now in the British Museum.





A.Gawan lith.

PLATE III.

Zone of Arietites Bucklandi.

Fig. 1. Arietites bisulcatus, *Bruguière* = Arietites multicostatus, *Sowerby*. Lateral view of a fine typical specimen, showing the foliations of the superior and inferior lateral lobes. Collected at Frethern-on-Severn, Gloucestershire, by John Jones, Esq., and now in the Museum of the School of Art and Science, Gloucester.

2. View of the siphonal area of the same Ammonite, showing the foliations of the siphonal lobes *in situ*.

3. An accurate outline of the foliations of the septa, showing the siphonal, superior lateral, inferior lateral, and auxiliary lobes.

A.Gawan lith.

Hanbury imp

PLATE IV.

Zone of Arietites Bucklandi.

FIG. 1. ARIETITES BISULCATUS, *Bruguière* = MULTICOSTATUS, *Sowerby*. Lateral view, natural size, of a typical specimen from the Lower Lias, near Berkeley. My collection.

2. Front view of the same, showing the position of the siphuncle.

3. View of the siphonal area of the same, showing the bisulcations on each side of the keel, the tubercles on the ribs, and their angular curvature forwards on the margin of the siphonal area.

4. Accurate outline of the foliations well seen in this specimen.

Fig 1.

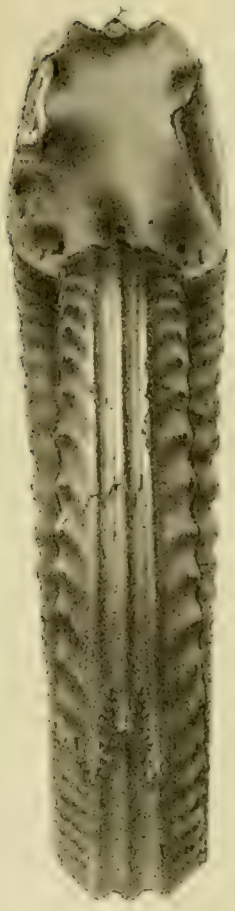


Fig 4

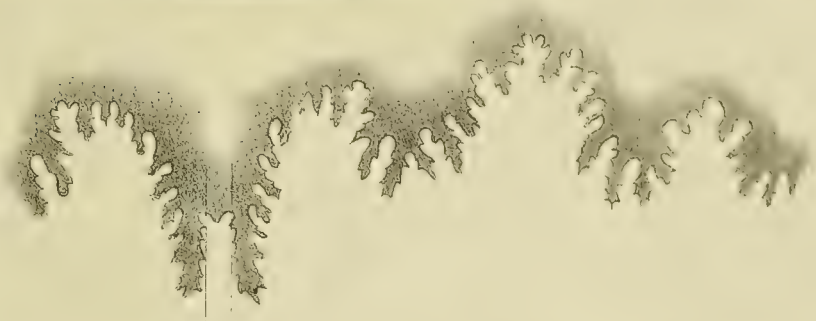


Fig 3

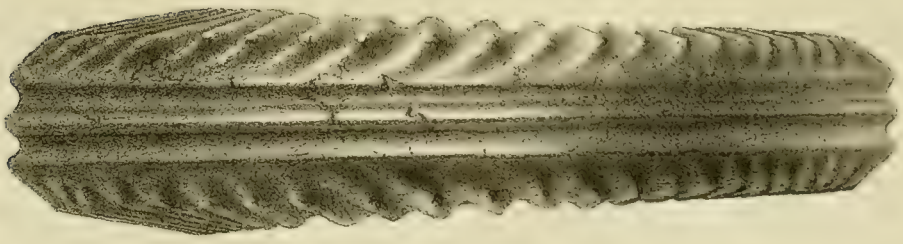


PLATE V.

Zone of Arietites Bucklandi.

Fig. 1. Arietites rotiformis, *Sowerby.* Lateral view, natural size, of the original type specimen figured by the late Mr. James De C. Sowerby in the 'Mineral Conchology' in 1825, from an example collected near Yeovil, and now in the British Museum. This fossil has a very rugged surface, owing to the shell having become decomposed in patches on the ribs and other parts.

2. View of the siphonal area of the same specimen, with the siphonal foliations *in situ.* Natural size.

3. Front view of the same, showing tubercles, keel, and bisulcations. Natural size.

4. View of the siphonal area of a large example from Lyme Regis, showing the shell-structure, keel, bisulcations, and siphonal ribs. Natural size.

Fig 1.

Fig 2.

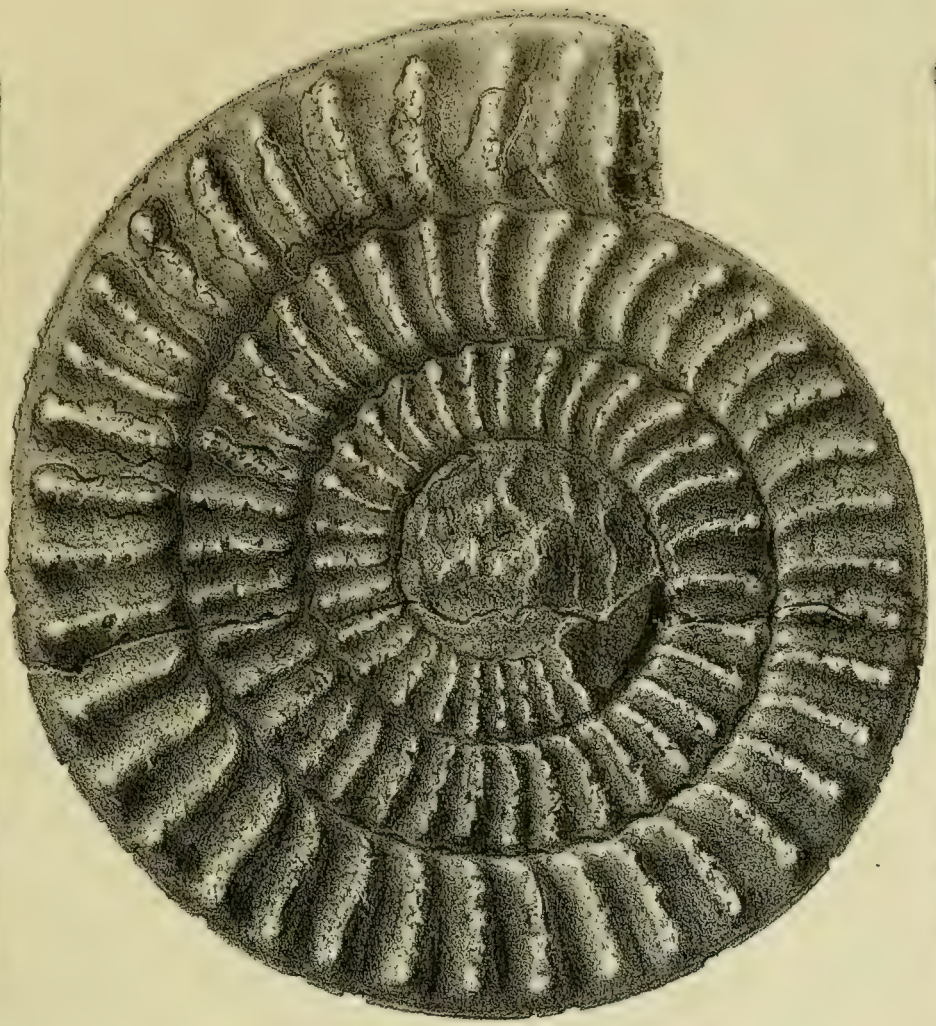


Fig 3.

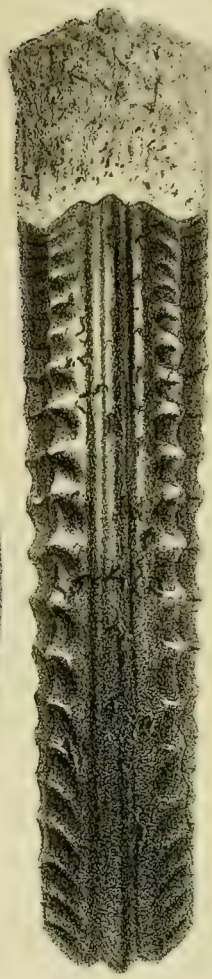


Fig 4

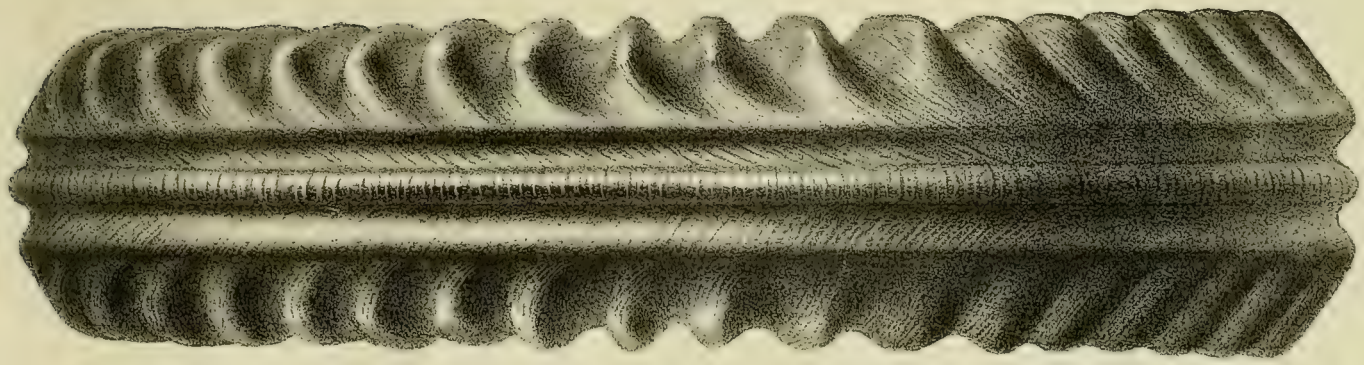


PLATE VI.

Zone of Amaltheus oxynotus.

Fig. 1. Arietites denotatus, *Simpson*. Lateral view. Natural size. The finest specimen known; from the Leckenby Collection, Woodwardian Museum, Cambridge.

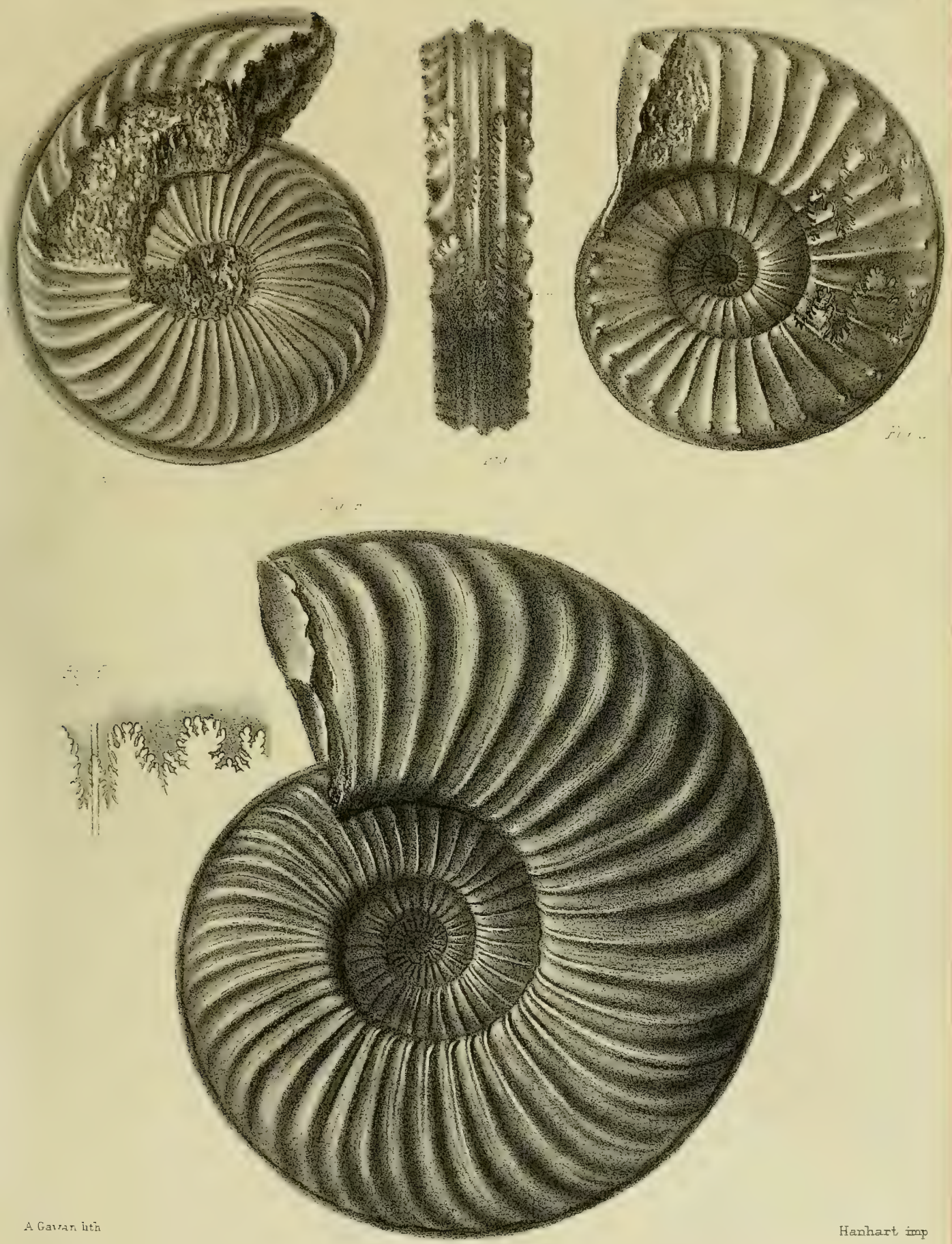
2. Arietites nodulosus, *Young and Bird* = Arietites obesulus, *Blake*. Lateral view of a small perfect specimen, magnified two diameters, collected from a brown sandy rock, Robin Hood's Bay. My collection.

3. View of the siphonal area of the same shell, showing the line of tubercles on the margin, with the oblique-forward directed ribs arising from the tubercular series. The outline of the foliations of the lateral lobes is well shown in Fig. 2, and the siphonal lobes are remarkable for their great elongation, and are seen in Fig. 3, where the superior lateral, inferior lateral, and auxiliary lobes are shown *in sitû*.

Zone of Arietites Bucklandi.

Fig. 4. Arietites Brooki, *Sowerby*. Lateral view, natural size, of a very beautiful Ammonite, with the shell-structure in fine preservation, and showing the lines of growth on its surface. My collection.

5. Accurate outline of the foliations of *Arietites Brooki* from another specimen, as none are visible in Fig. 4, in consequence of the presence of the shell all over the mould. My collection.



A Gavan lith

Hanhart imp

PLATE VII.

Zone of Arietites Bucklandi.

Fig. 1. Arietites rotiformis, *Sowerby*. Lateral view of another specimen in the Sowerbyan Collection in the British Museum, entirely denuded of shell, and showing the mould forms of the ribs and tubercles. Natural size.

Zone of Arietites raricostatus.

Fig. 2. Arietites raricostatus, *Zieten*. Lateral view, with much of the shell preserved; from a fine specimen in the British Museum. Natural size. Locality unknown.

3. View of the siphonal area of the same shell, showing the keel and the disappearance of the ribs after they turn the border.
4. Front view of the same shell showing like characters. Natural size.
5. Form of the foliations in this species.
6. A smaller individual of the same species, in my collection, to show the size of the air-chambers and the distance the septa are from each other.

Fig 1

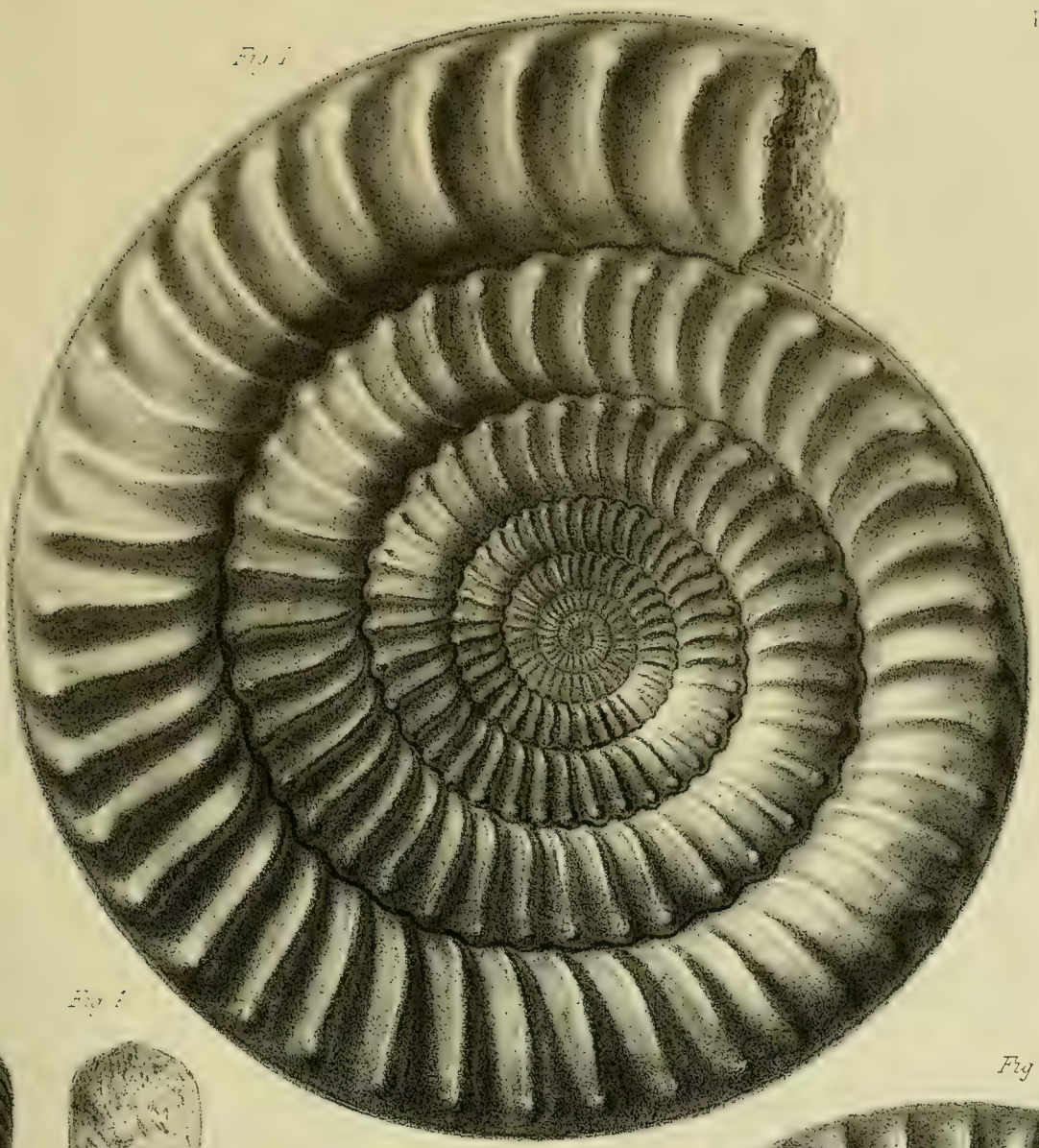


Fig 3.

Fig 4

Fig 2

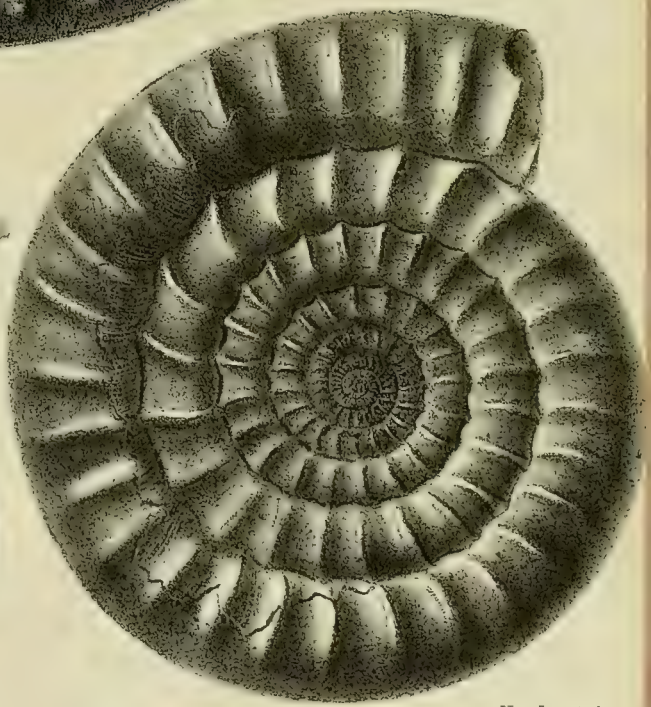


Fig 5.

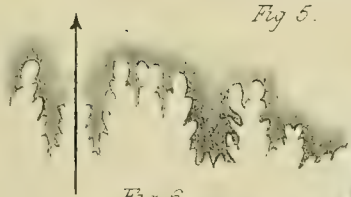


Fig. 6.

PLATE VIII.

Zone of Arietites Bucklandi.

Fig. 1. Arietites Sauzeanus, *d'Orbigny*. A large specimen, in my collection ; collected at Bredon, Midland Railway cutting, Gloucestershire. Lateral view, natural size, showing the rib-flexures and tubercles near the outer margin of the siphonal area. Most of the shell preserved.

2. Front view of the same fossil, showing lobes, keel, and tubercles.

3. Accurate outline of the foliations of the septa in this species.

4. Lateral view of a smaller shell, collected at Darlingscott, near Shipton-on-Stour, Worcestershire, showing the sharp ribs and tubercles. Natural size.

5. Lateral view of a small shell from Darlingscott, showing the sharpness of the mould. Natural size. The Darlingscott specimens were collected by my friend John Kershaw, Esq., Warwick, and kindly presented to me for this work.

6. View of the siphonal area of the same. The keel and ribs are more prominent in this specimen than usual on the siphonal area. Natural size.

Fig. 2.

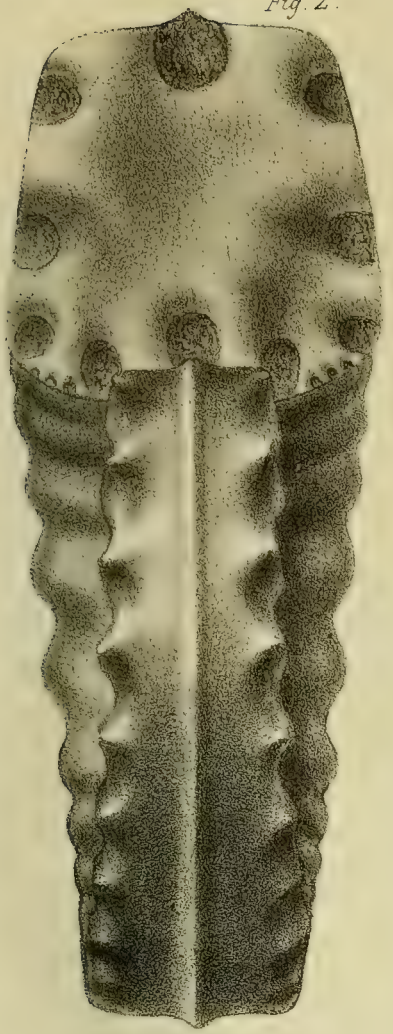


Fig 1

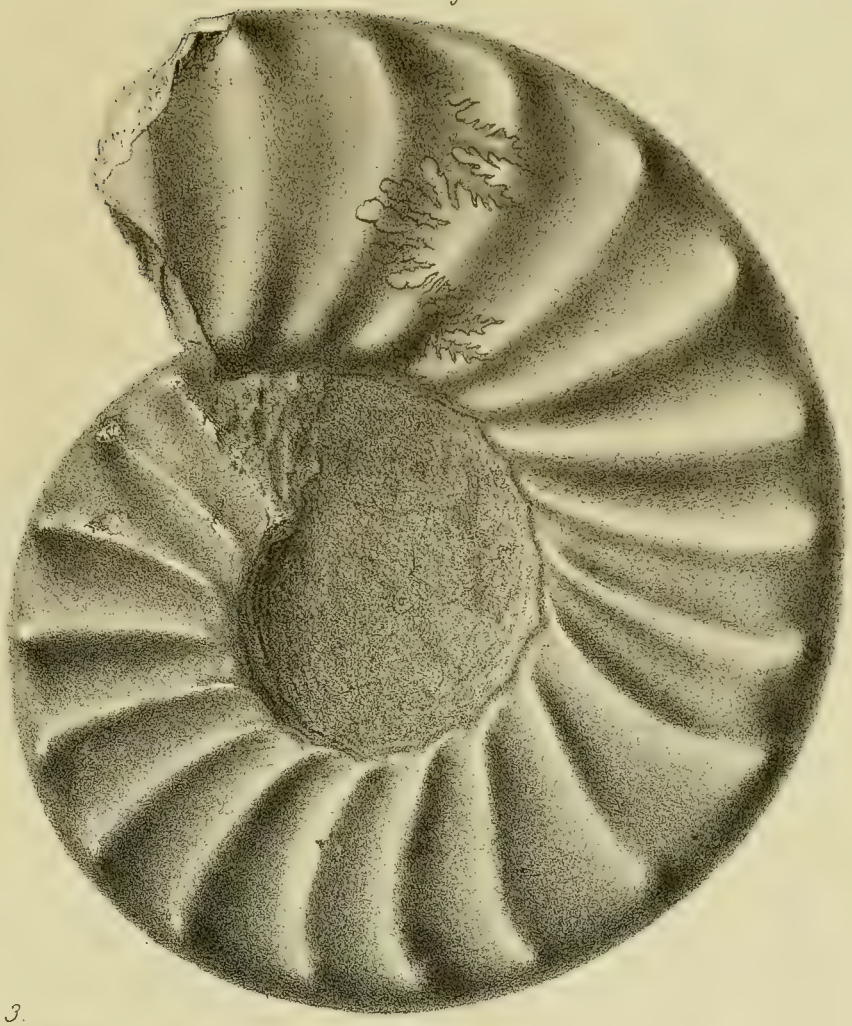


Fig 3.

Fig 4

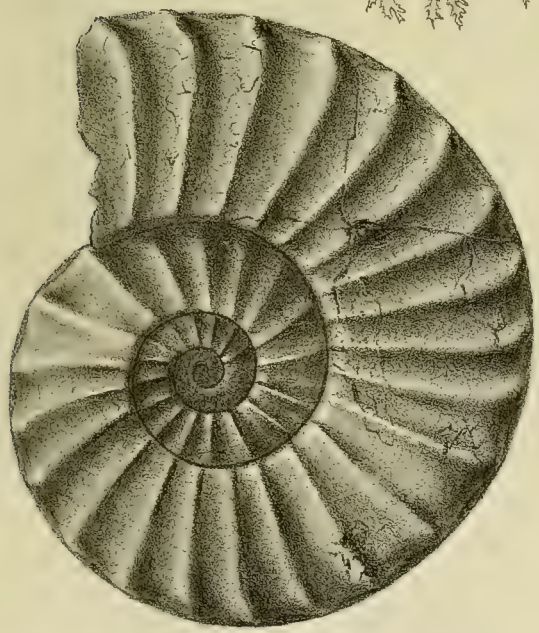


Fig 5

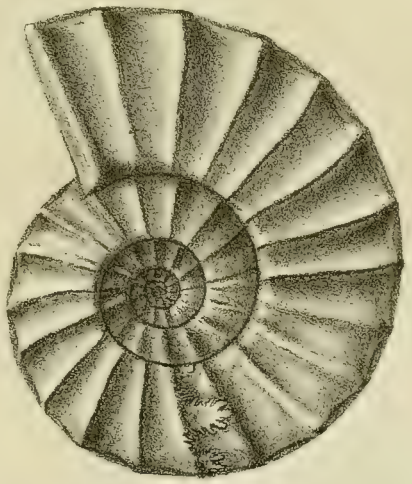


Fig 6

A.Gawan lith.

Hanhart imp.

PLATE IX.

Zone of Arietites Bucklandi.

Fig. 1. Arietites rotiformis, *Sowerby*. Lateral view of a fine specimen, natural size, with the shell preserved, from the Lower Lias de l'Auxois, Semur, Côte-d'Or; kindly given me by Monsieur J. J. Collenot, of Semur, to illustrate this work.

2. Front view of the same specimen, natural size, to show the siphonal area and depth of the bisulcations, with the spine-like character of the tubercles.

3. An accurate outline of the foliations of the septa magnified.

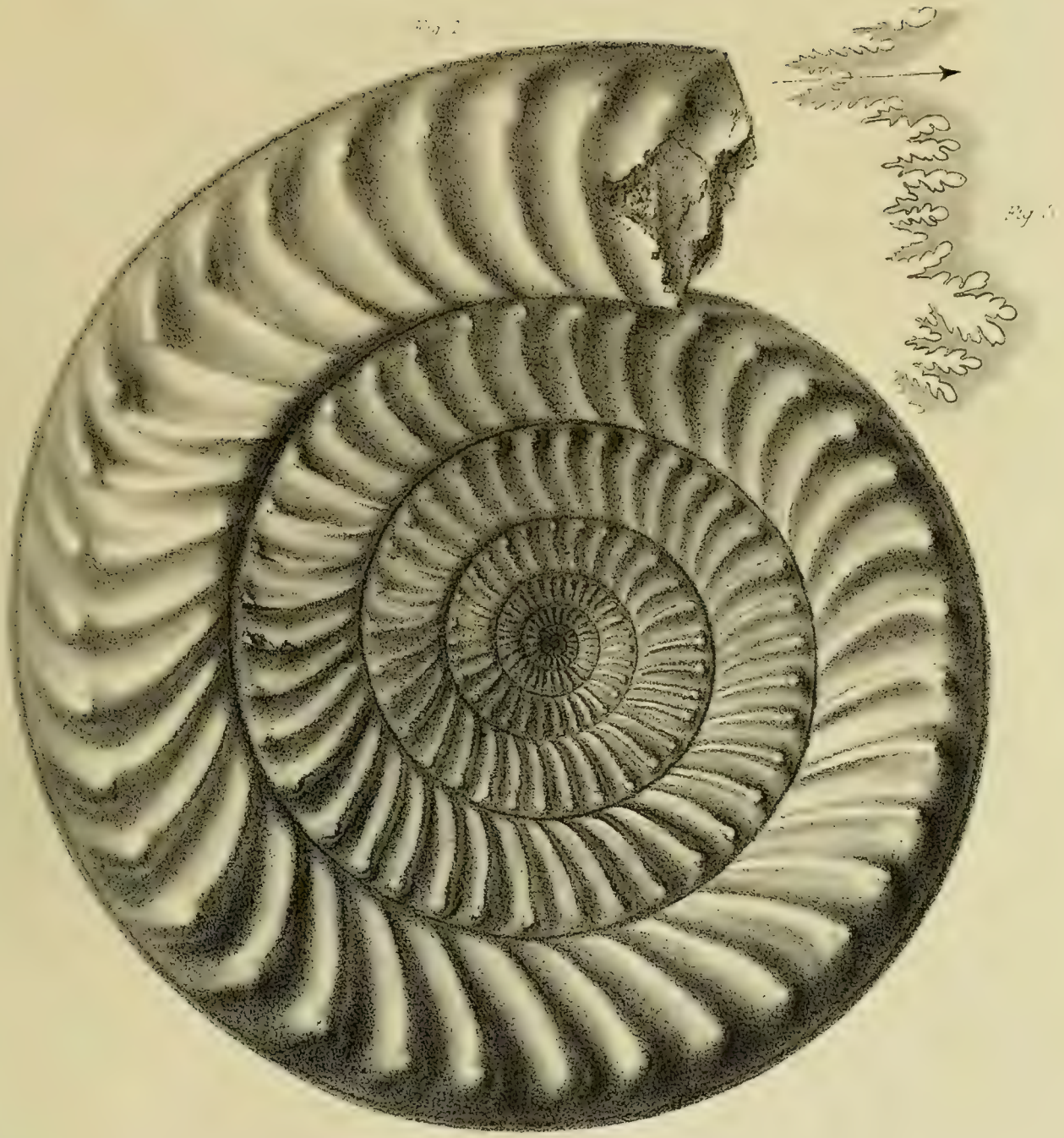
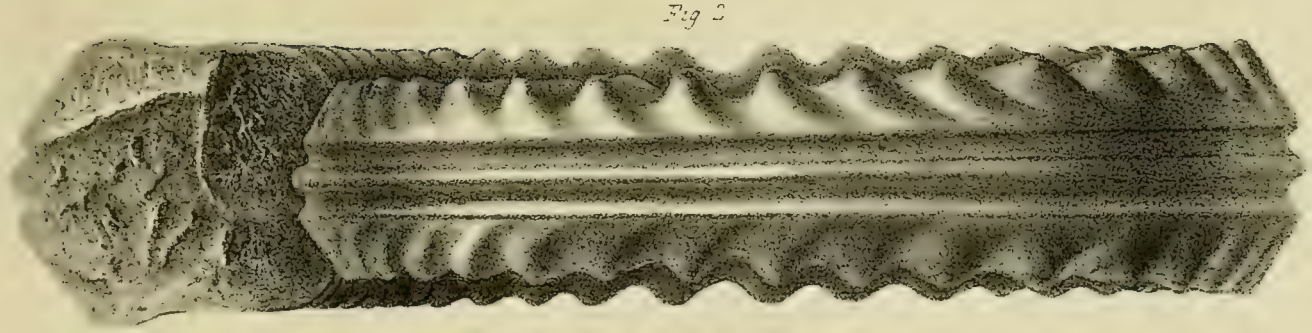


Fig 2



A.Gawan lith.

Hanhart imp

PLATE X.

Zone of Arietites Bucklandi.

Fig. 1. Arietites Crossii, *Wright.* Lateral view, half the natural size, from the Scunthorpe Ironstone, North-west Lincolnshire, remarkable for the great development of the ribs near the line of involution, from the collection of the Rev. J. E. Cross, F.G.S., Appleby, Brigg, Lincolnshire.

2. Back view of the same fossil to show the narrow siphonal area, sharp narrow keel, shallow bisulcations, and trenchant ribs.

Fig. 1.

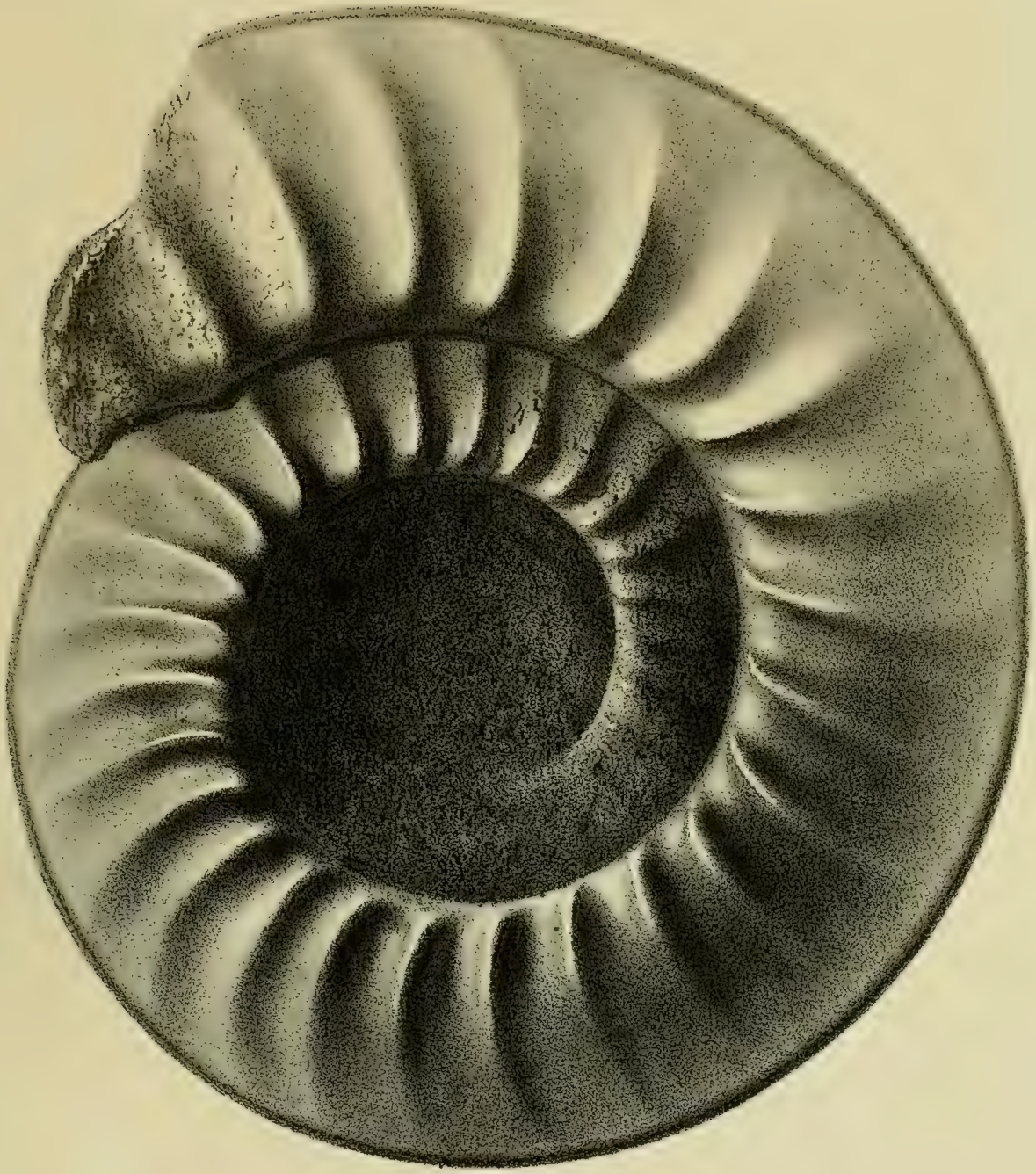
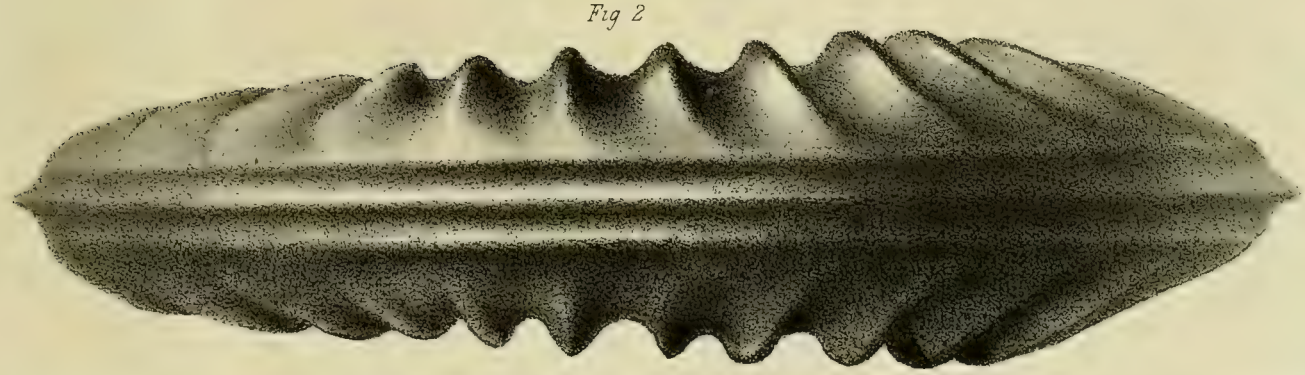


Fig 2



A.Gawan lith.

Hanhart imp

PLATE XI.

Zone of Arietites Turneri.

Fig. 1. Arietites Bonnardii, *d'Orbigny*. Lateral view, natural size, from Lyme Regis, in my collection.

2. Back view of the siphonal area, showing the oblique rib terminations.

3. Front view do. do. do.

Zone of Aegoceras Jamesoni.

4. Aegoceras Jamesoni, *Sowerby*. Lateral view, natural size of a good type form of this rare species; the specimen was collected at Hechingen, Württemberg.

5. Back view of siphonal area of the same fossil, showing the rib arches.

6. Front view do. do. do. My collection.

Fig 2

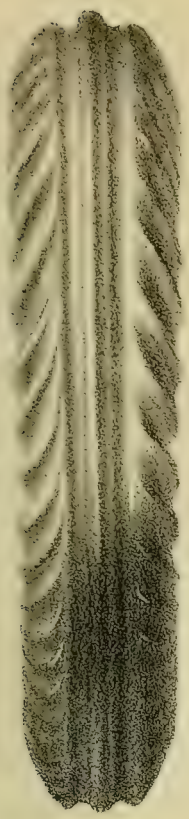


Fig 1

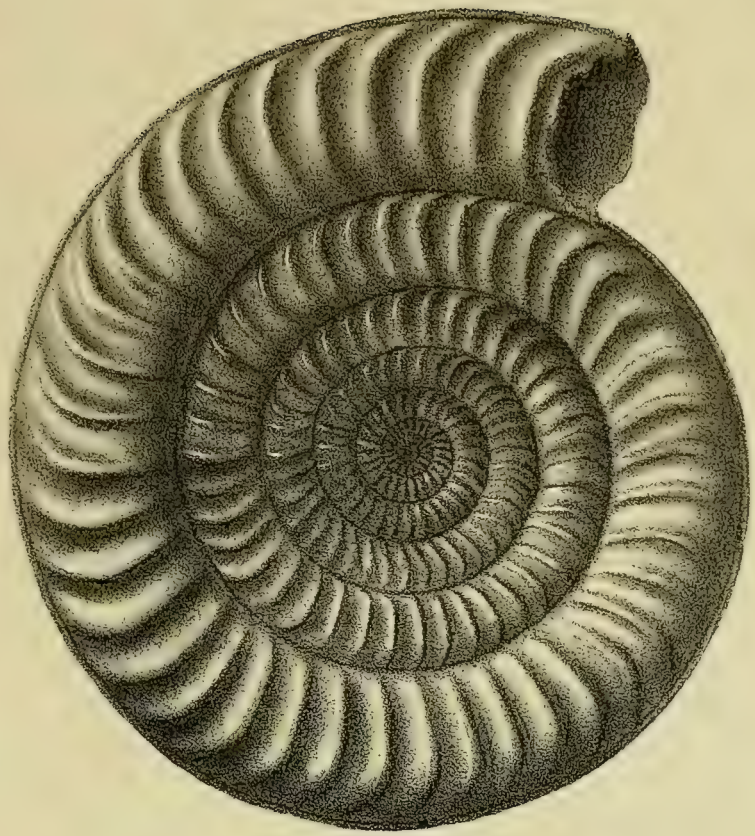


Fig 3

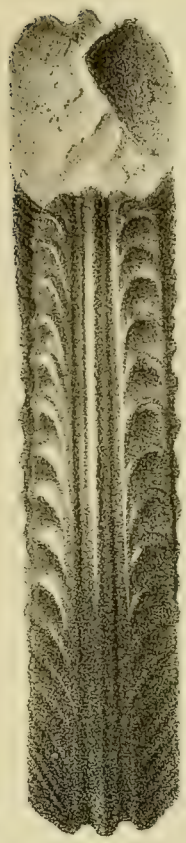


Fig 5

Fig. 4.

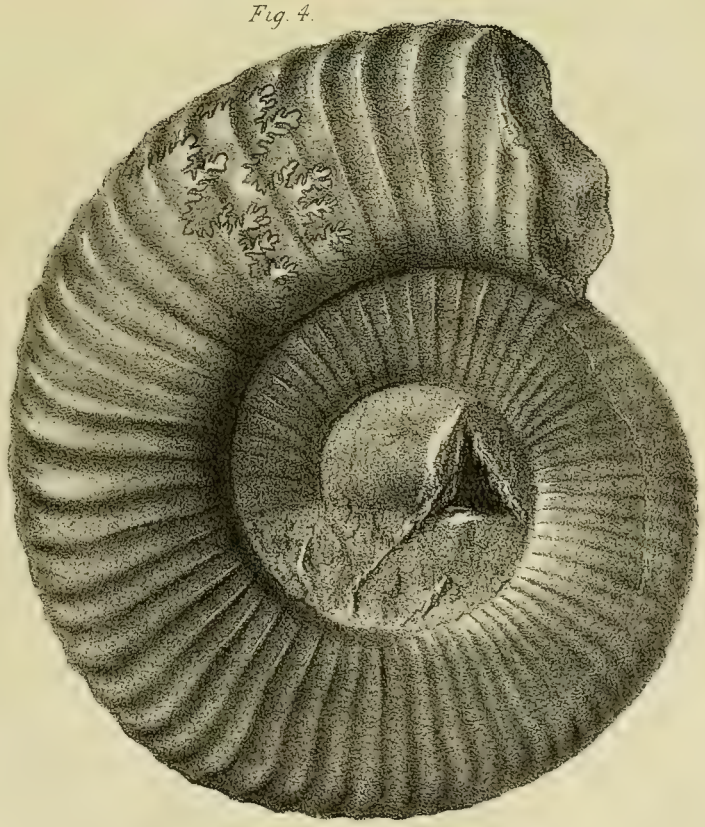
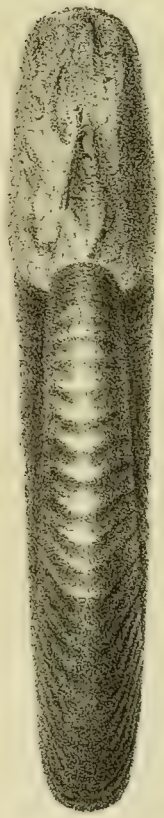


Fig. 6.



A.Gawan lith

Hanhart imp

PLATE XII.

Zone of Arietites Turneri.

Fig. 1. Arietites Turneri, *Sowerby.* Lateral view, natural size, from Bredon, Worcestershire, obtained in cutting the Midland Railway. My collection.

2. Front view of siphonal area and line of dorsal suture.
3. Back view do. do.
4. Lateral view of one of Sowerby's type specimens in the British Museum, figured as a good example for comparison.
5. Accurate outline of lateral lobes and saddles, enlarged.
6. Do. do. of dorsal lobes and saddles, do.

Fig 1

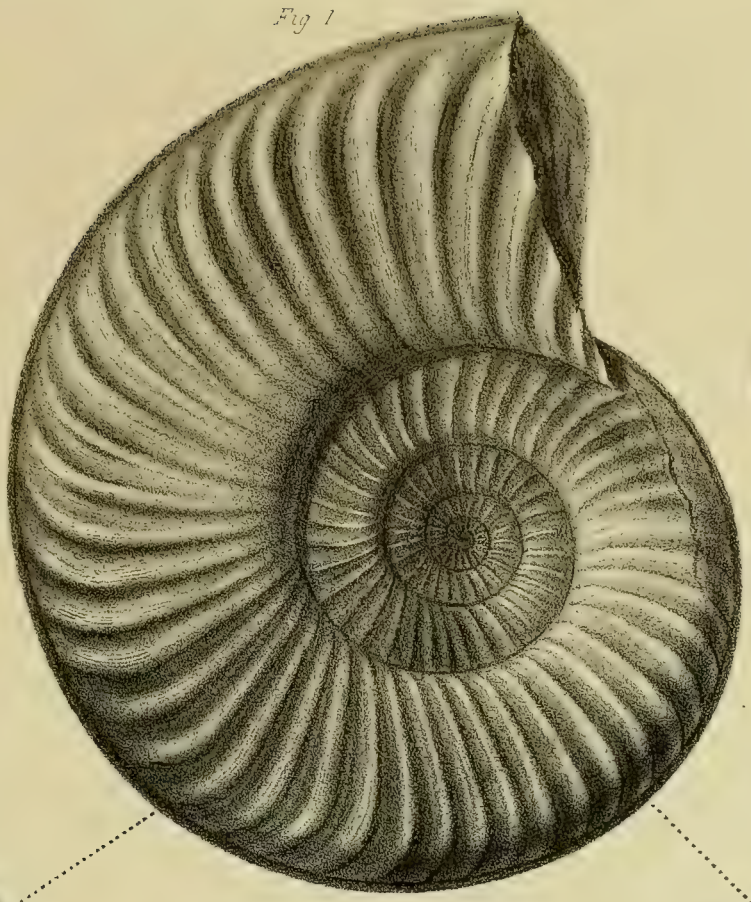


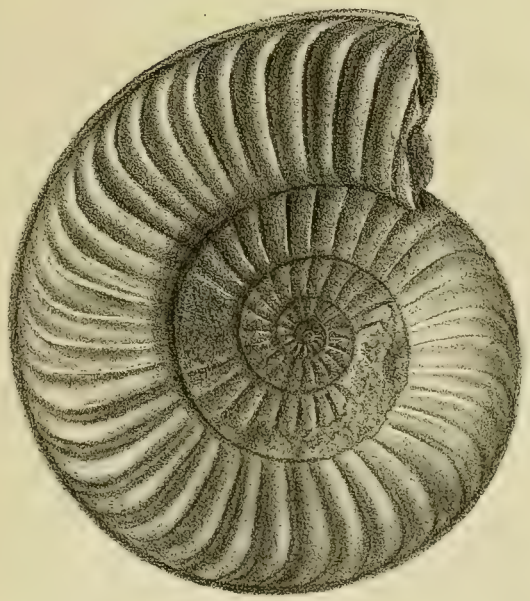
Fig 5

Fig 6

Fig 2

Fig 3

Fig. 4



A.Gawan lth.

Hanhart imp

PLATE XIII.

Zone of Arietites Bucklandi.

Fig. 1. ARIETITES SCIPIONIANUS, *d'Orbigny*. Lateral view, natural size, Semur, Côte d'Or.

2. — — — Front view of siphonal area.

3. Accurate outline of the dorsal and lateral lobes and saddles, enlarged.

Fig. 1.

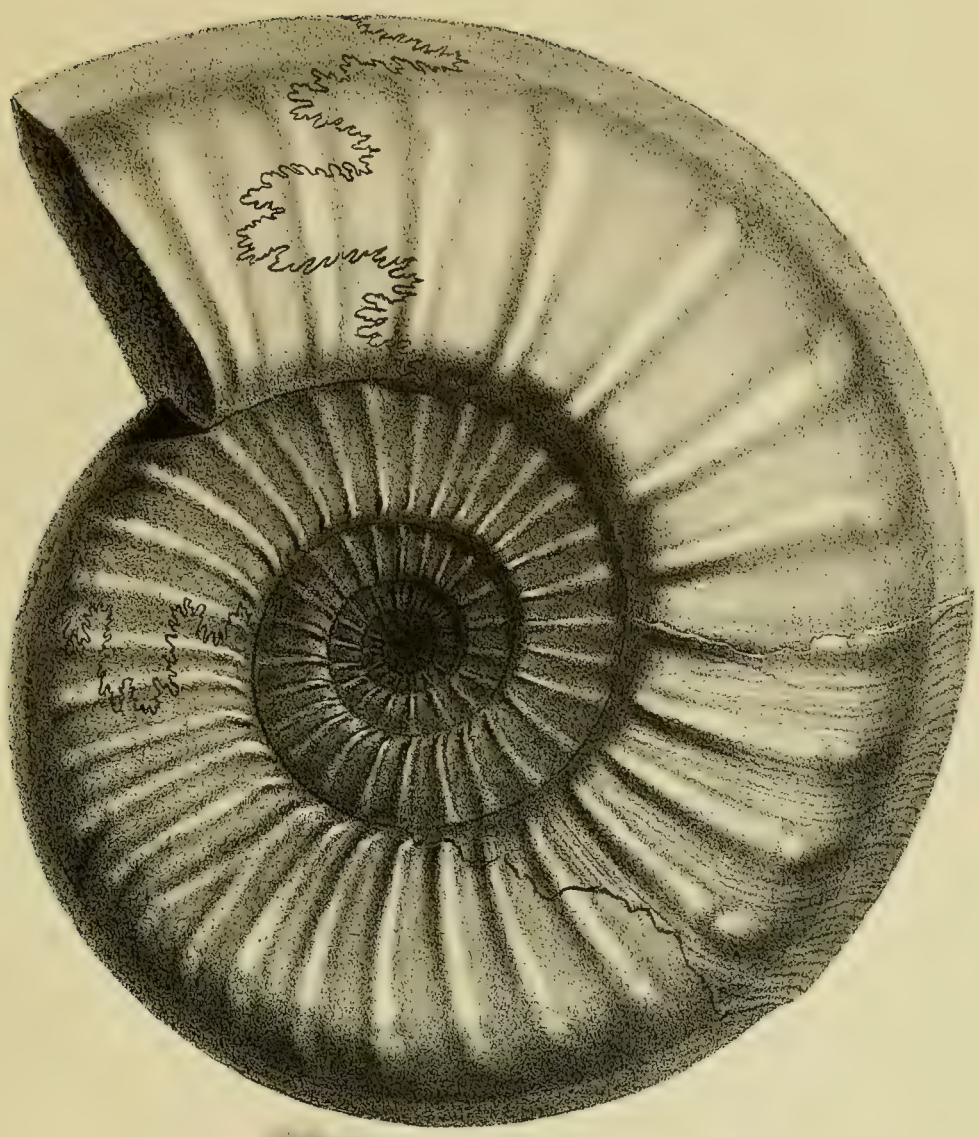
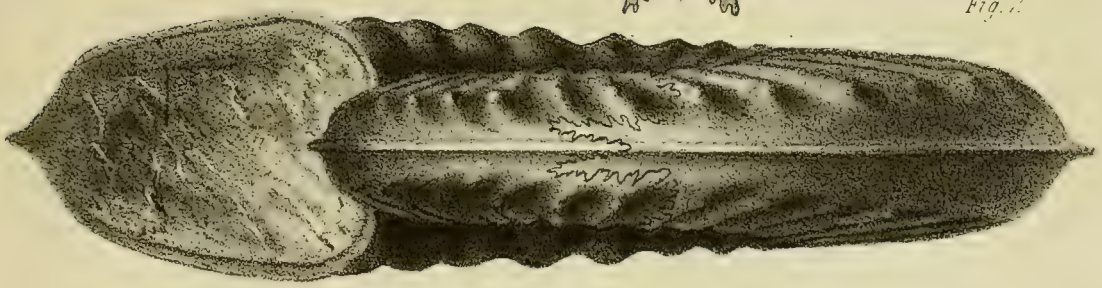


Fig 3

Fig. 2



A.Gawan lith

Hanhart imp

PLATE XIV.

Zone of Aegoceras planorbis.

Fig. 1. AEGOCERAS PLANORBIS, *Sowerby*. Side view, natural size, from Lower Lias, Robin Hood's Bay. Woodwardian Museum, Cambridge. Leckenby Collection.

2. Front view, natural size, of the same specimen.

3. Lateral view of *Aegoceras planorbis*, from the Lower Lias of Württemberg, with the *Aptychus* and *oral aperture* contraction, drawn by Dr. W. Waagen, "Ueber die Ansatzstelle der Haftmuskeln beim Nautilus und den Ammoniden," 'Palæontographica,' Band xvii, T. xl.

4. Accurate outline of the dorsal and lateral lobes and saddles, enlarged.

Zone of Aegoceras angulatum.

5. AEGOCERAS ANGULATUM, *Schlotheim*. Lateral view, natural size. Lyme Regis. My collection.

6. Siphonal area showing the flexure of the ribs and angles they describe.

Fig. 3

Fig. 2.

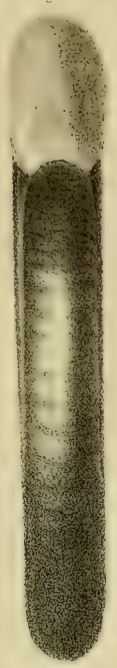


Fig. 1.

Fig. 4

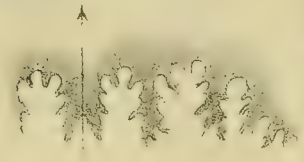


Fig. 6

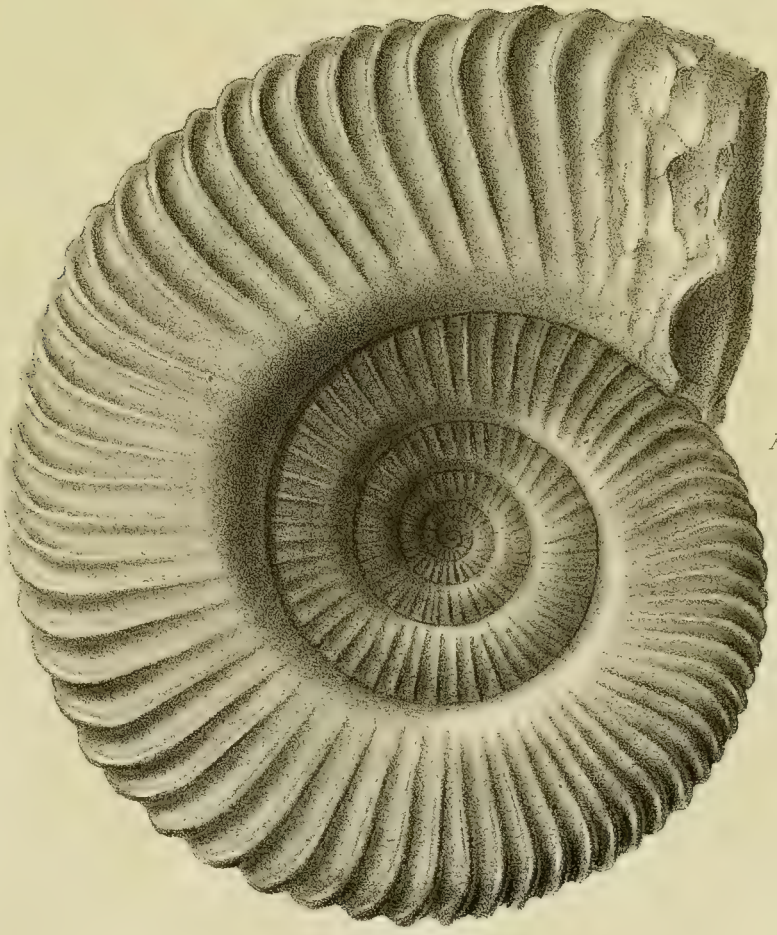


Fig. 5.

A.Gawan lith.

Hanhart imp.

PLATE XV.

Zone of Aegoceras angulatum.

Fig. 1. AEGOCERAS LIASSICUM, *d'Orbigny*. A fragment from the Trent Valley, Lincolnshire. Rev. J. E. Cross, F.G.S., Appleby, Brigg, Lincolnshire.

2. — — — Side view of the same, natural size.

3. AEGOCERAS INTERMEDIUM, *Portlock*. Side view, natural size. Museum of the Irish Geological Survey. One of General Portlock's type specimens.

4. — — — Siphonal area of the same fossil.

5. — — — Side view of a large specimen from the same collection.

6. — — — Siphonal area of the same shell.

7. AEGOCERAS BELCHERI, *Simpson*. Side view, natural size. Lower Lias, Robin Hood's Bay. Woodwardian Museum, Cambridge. Leckenby collection.

8. — — — Siphonal area of the same fossil.

9. — — — Lobes and saddles of same highly magnified.

10. AEGOCERAS TORTILE, *d'Orbigny*. Side view, natural size. Sent me by Monsieur A. Etallon. Collected in the Lower Lias, France.

11. — — — Siphonal area and dorsal lobes of same.

12. — — — Front view of siphonal area.

Fig 1.

Fig 2.

Fig 4.

Fig 3.

Fig. 9

Fig 5.

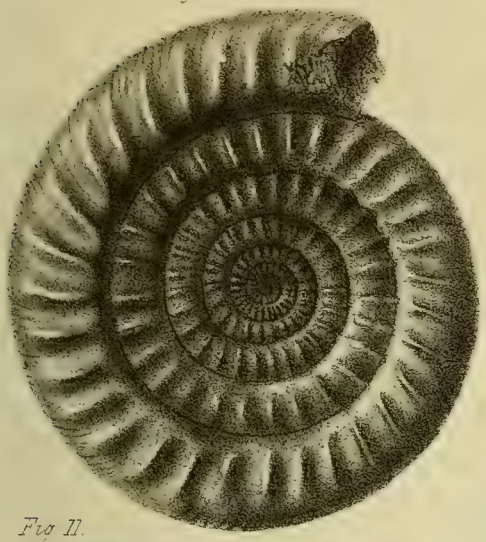


Fig. 6.

Fig 8.

Fig. 7

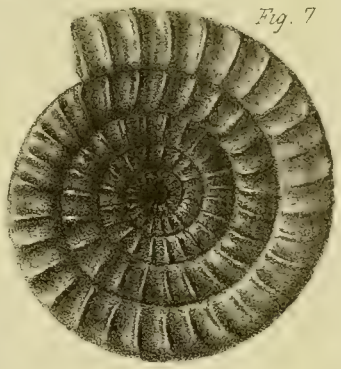


Fig 11.

Fig. 10.

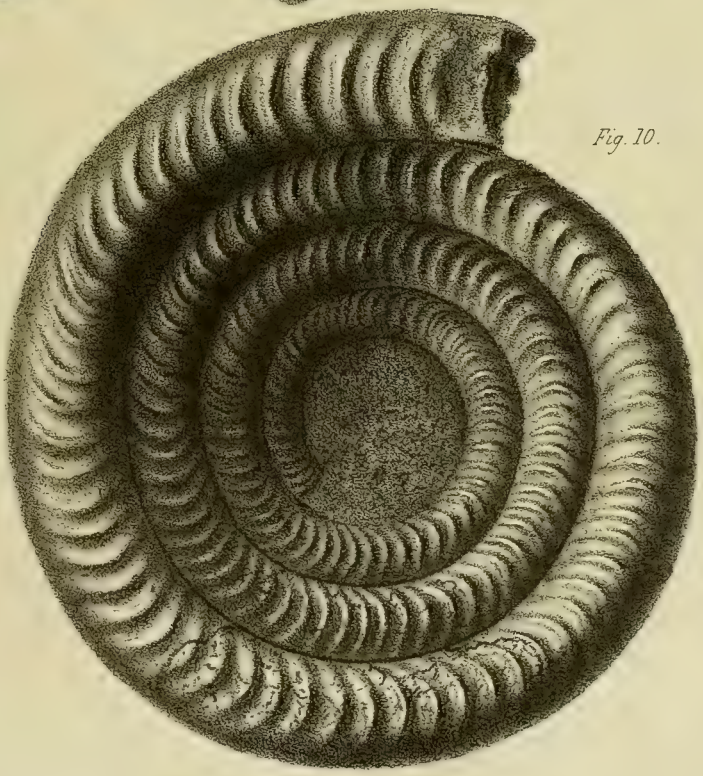


Fig 12.

PLATE XVI.

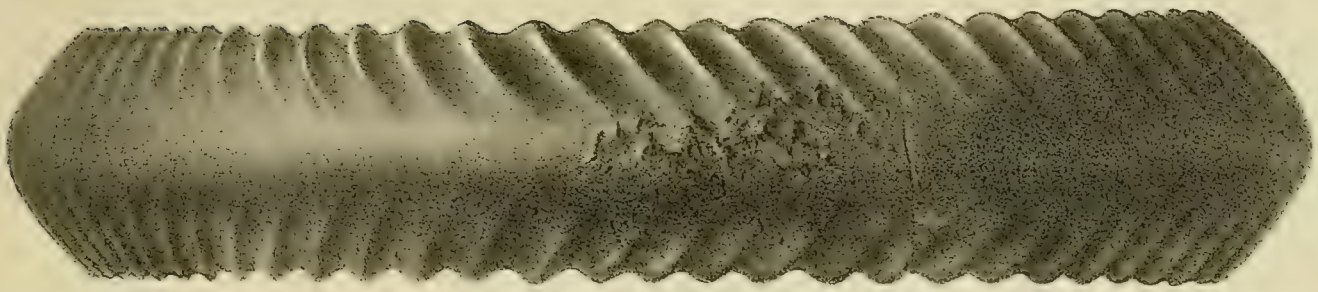
Zone of Aegoceras angulatum.

Fig. 1. Aegoceras Liassicum, *d'Orbigny.* Side view, natural size. Lower Lias, Redcar, Yorkshire. My collection. Procured at Whitby.

2. — — — Siphonal area of the same fossil to show the absence of the ribs in this region.

This specimen resembles two large examples of this species contained in the d'Orbignian type collection in the "Jardin des Plantes," Paris.

Fig 2



A Gawan lith

PLATE XVII.

Zone of Aegoceras angulatum.

Fig. 1. AEGOCERAS ANGULATUM, *Schlotheim* = AMMONITES MOREANUS, *d'Orbigny*. Side view, natural size. Lyme Regis. My collection.

2. — — — Front view of the siphonal area of the same fossil showing the rib terminations.

3. — — — Lateral view of ribbing in another specimen from the same bed.

4. — — — Continuous ribbing over the siphonal area in the same specimen.

5. — — — Smaller and closer ribbed variety from the same bed, natural size.

6. — — — Siphonal area with interrupted ribbing, forming angles in the same.

Fig. 1

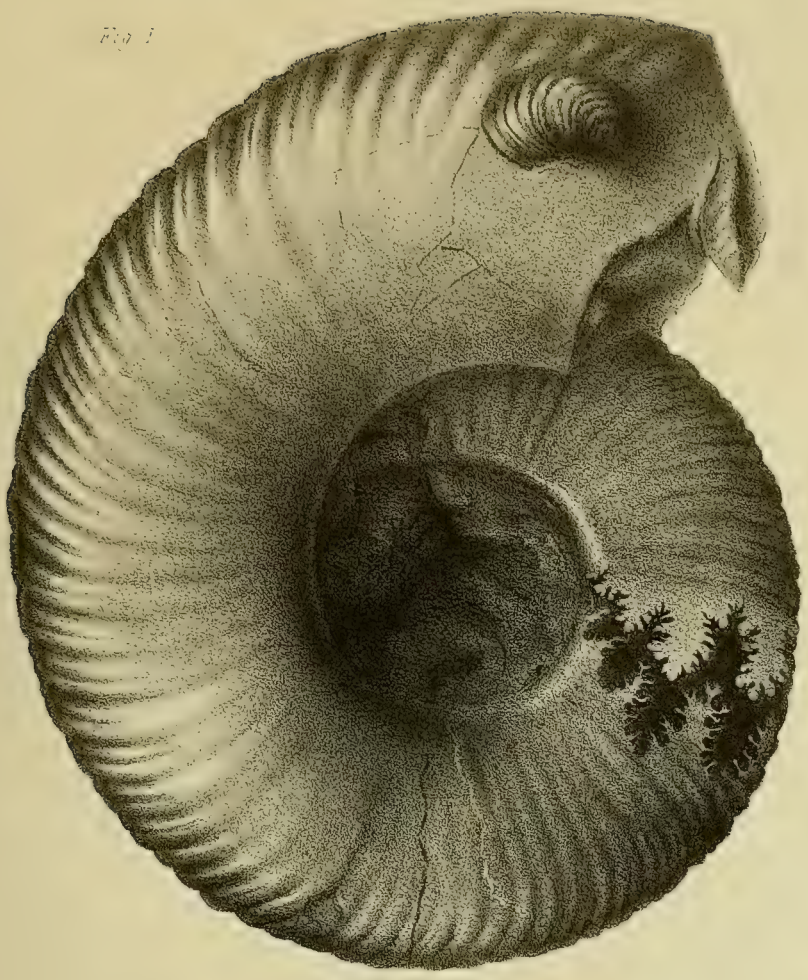


Fig. 2

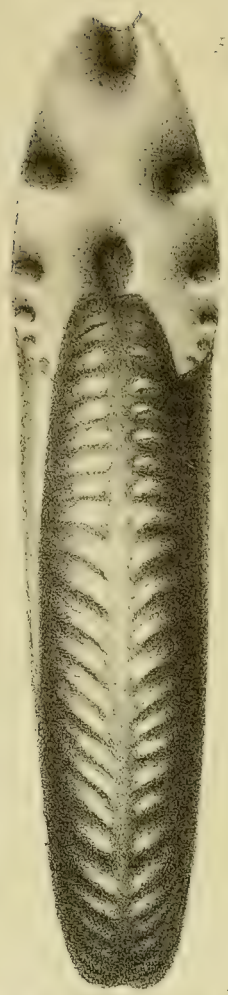


Fig. 3

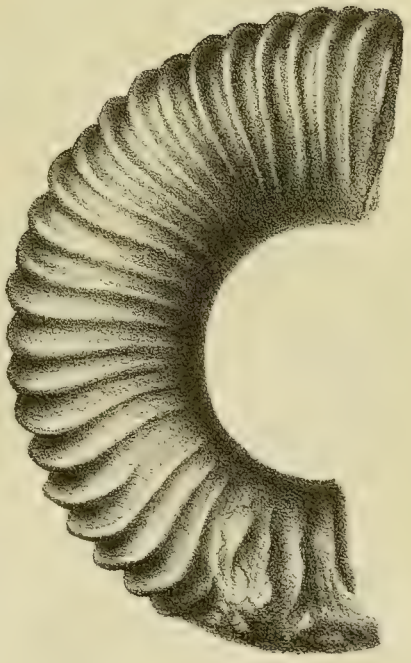


Fig. 4

Fig. 5

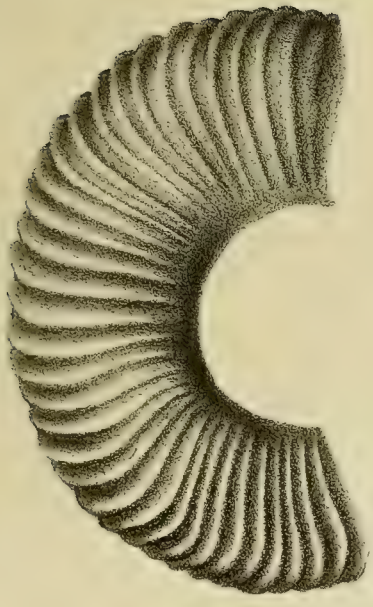


Fig. 6

PLATE XVIII.

Zone of Arietites Bucklandi.

Fig. 1. Aegoceras Boucaultianum, *d'Orbigny*. Lateral view, natural size, from the Upper Bucklandi beds of the Scunthorpe ironstone, North-West Lincolnshire, collected by the Rev. J. E. Cross, F.G.S., to whose collection this unique specimen belongs.

2. — — — This figure represents the shell reduced to one third the natural size, from a specimen in the collection of Monsieur Boucault, of Semur. I have seen specimens of this species in the Semur Museum with the shell preserved which measured from twelve to fifteen inches in diameter.

3. — — — Front view of the same shell to show the auxiliary lobes, depressions, and ornamentation on the margins of the siphonal area.

4. — — — A portion of the foliations of the septa drawn by the late Prof. Alcide d'Orbigny, the size of nature.

A.Gawan lith.

Hanhart imp

PLATE XIX.

Zone of Aegoceras planorbis.

Fig. 1. AEGOCERAS BELCHERI, *Simpson.* Side view, natural size. From the cabinet of the Rev. T. Wiltshire, F.G.S.

2. — — — Siphonal area of the same, smooth.

3. — TORUS, *d'Orb.* = JOHNSTONI, *Sow.* Natural size. Prof. Deslongchamp's collection.

4. — — — Siphonal area of same, smooth.

5. — CATENATUM, *Sowerby.* Side view, natural size. My collection.

6. — — — Siphonal area, showing the ribbing.

7. — — — Lobe-line, showing lobes and saddles magnified.

8. ARIETITES SCIPIONIANUS, *d'Orb.* Lateral view, natural size. My collection.

9. — — — Siphonal area showing deep keel.

10. — — — Lobe-line with lobes and saddles magnified.

Fig 1

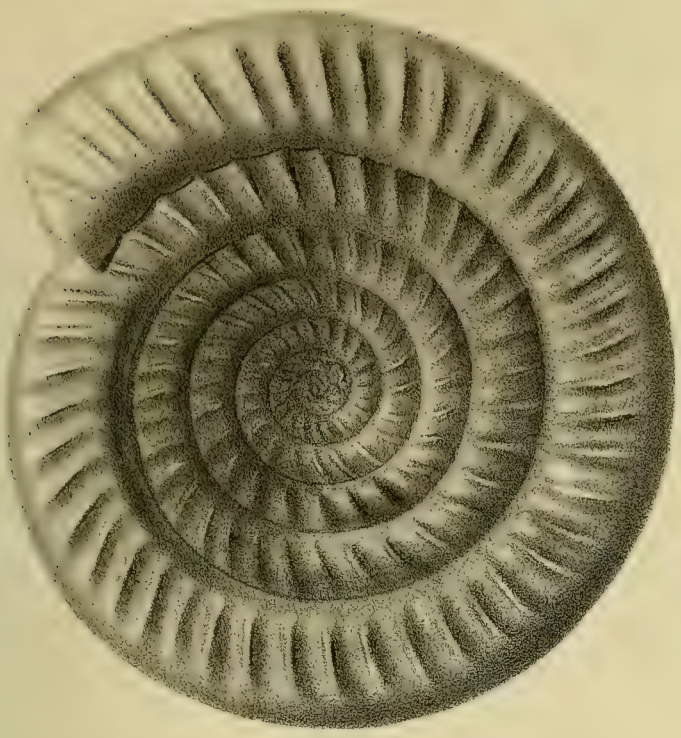


Fig 3

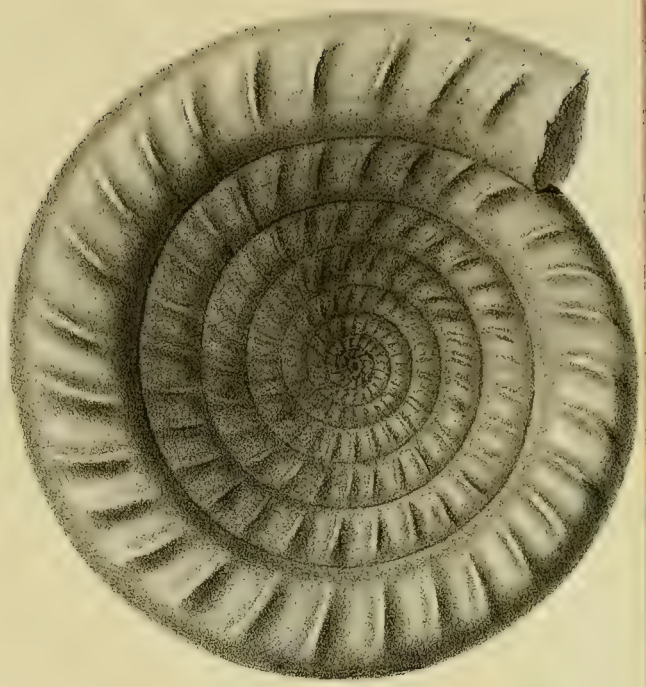


Fig 2.

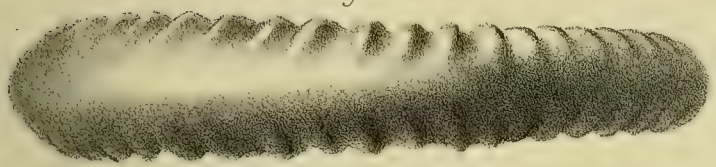


Fig 4.

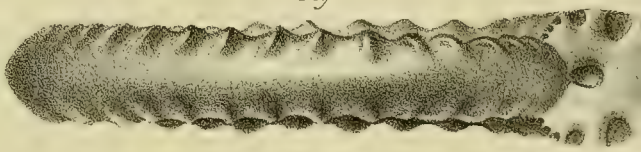


Fig 8.

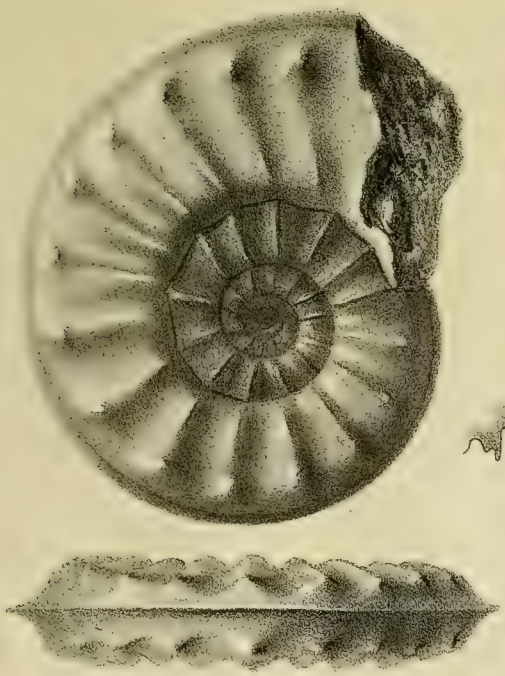


Fig 10.

Fig 5.

Fig 7

Fig 6.

Fig 9

Hanhart imp

PLATE XX.

Zone of Aegoceras angulatum.

Fig. 1. AEGOCERAS CHARMASSEI, *d'Orbigny*. Side view, natural size: together with a very accurate tracing of the complicated lobe-line, showing the lobes and saddles *in sitú* on the side of this Ammonite. My collection from Lyme Regis.

2. — — — Front view, showing sulcus on the siphonal area and rib tubercles there.

3. — — — Back view of the same fossil.

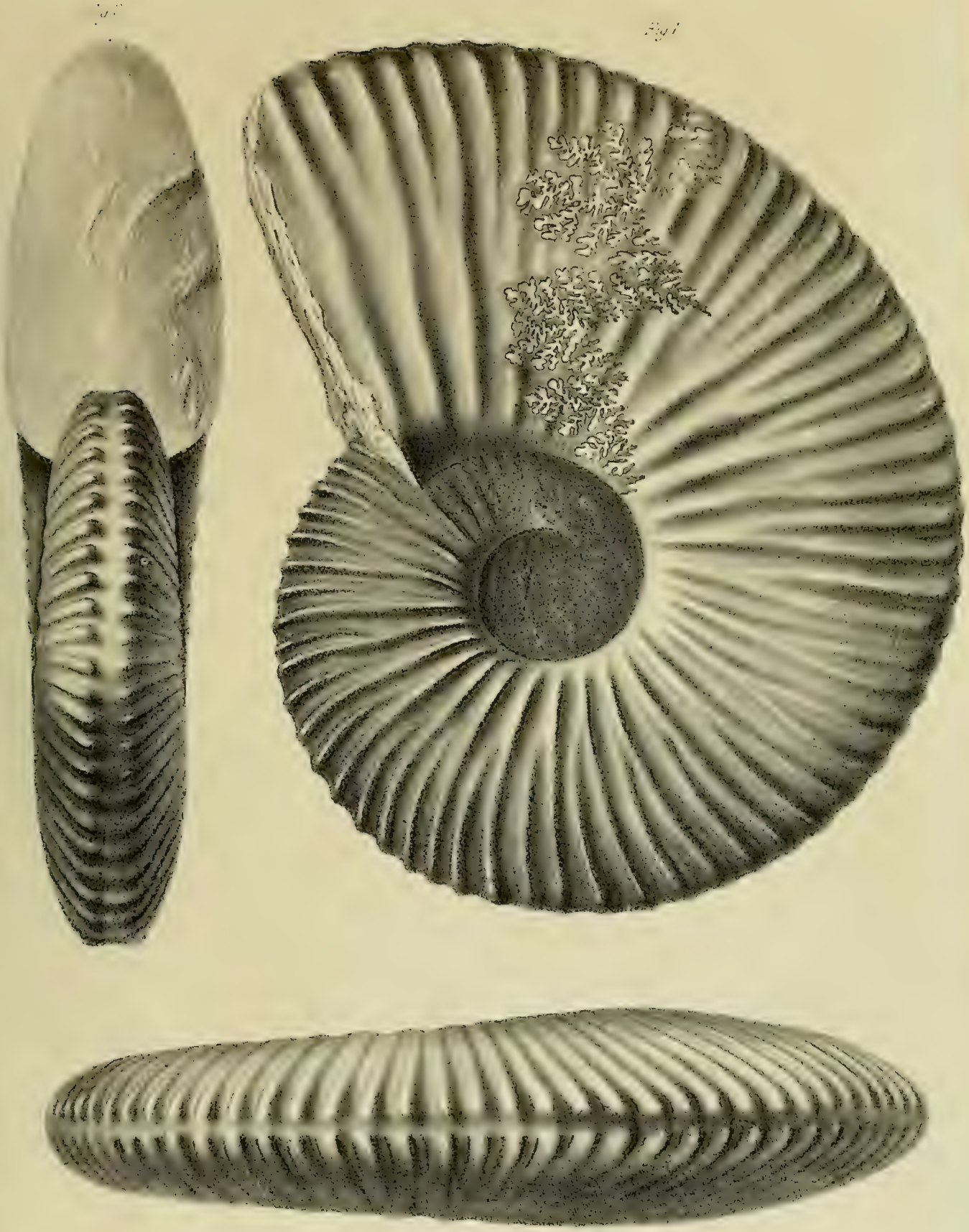


Fig. 3

PLATE XXI.

Zone of Arietites obtusus.

Fig. 1. ARIETITES OBTUSUS, *Sowerby*. Side view, natural size. My collection.
2. — — — Front view, natural size. Do. do.
3. — — — Another larger specimen, natural size. My collection.
4. — — — Side view, showing the extent of involution.
5. — — — Lobe-lines, showing the lobes and saddles.

All the specimens figured in this plate have a portion of the external lamina of the shell preserved, the surface is sculptured with longitudinal and transverse lines, which are finely punctated at their intersections. This kind of sculpture is rare, and found only, as far as I know, in ARIETITES OBTUSUS, SOW., AR. STELLARIS, SOW., and AEGOCERAS PLANICOSTA, SOW.

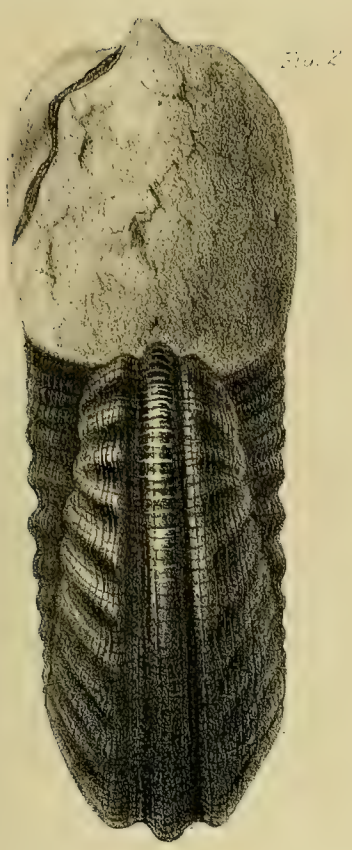


Fig. 2.

Fig 1.

Fig 5.

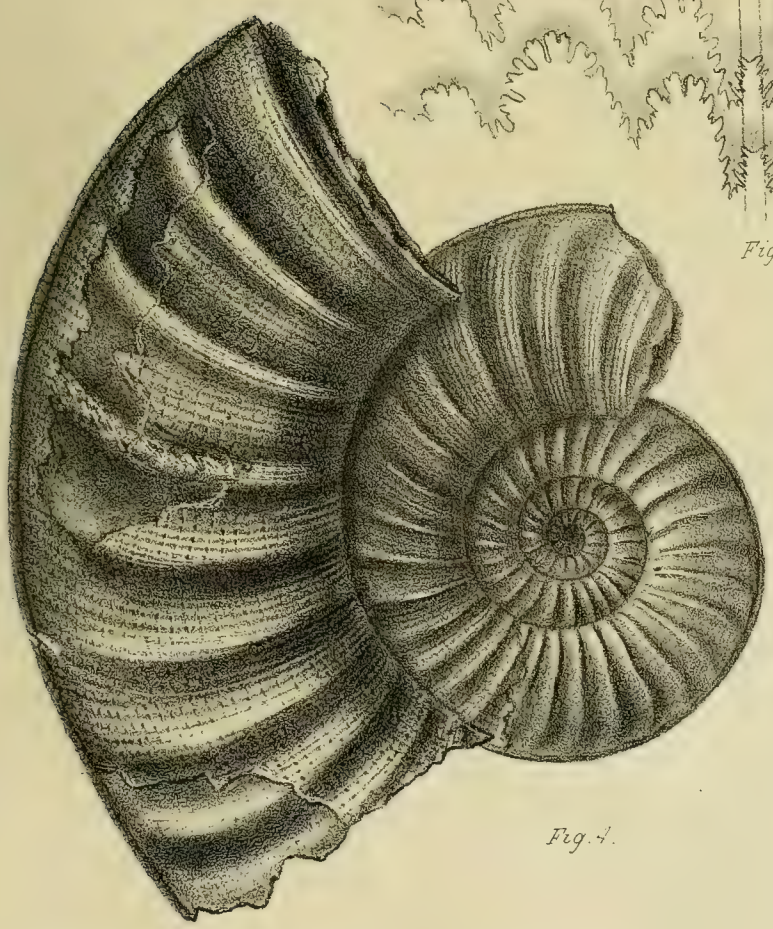


Fig. 4.

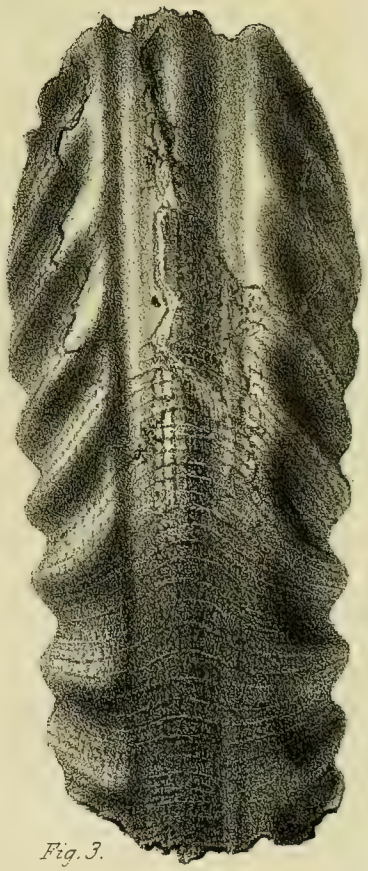


Fig. 3.

A.Gawan lith.

Hanhart imp.

PLATE XXII.

Zone of Arietites obtusus.

Fig. 1. ARIETITES STELLARIS, *Sowerby*. Side view, natural size. British Museum.
2. — — — Siphonal area, with keel, channels, and shell structure.
3. — — — Another specimen, showing lobe-lines *in situ*.
4. — — — Front view of same fossil.
5. — — — Siphonal area of same fossil.
6. — — — Lobe-lines, lobes, and saddles magnified.

The fossil shells figured in this plate all belong to the Sowerbian type collection in the British Museum. The smaller specimens (figs. 3, 4, 5, and 6) were those figured in the 'Mineral Conchology,' and are specially marked with Sowerby's green ticket.

Fig. 4.

Fig. 3.

Fig. 5.

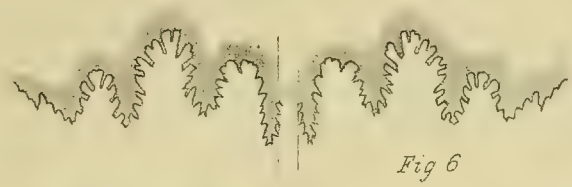
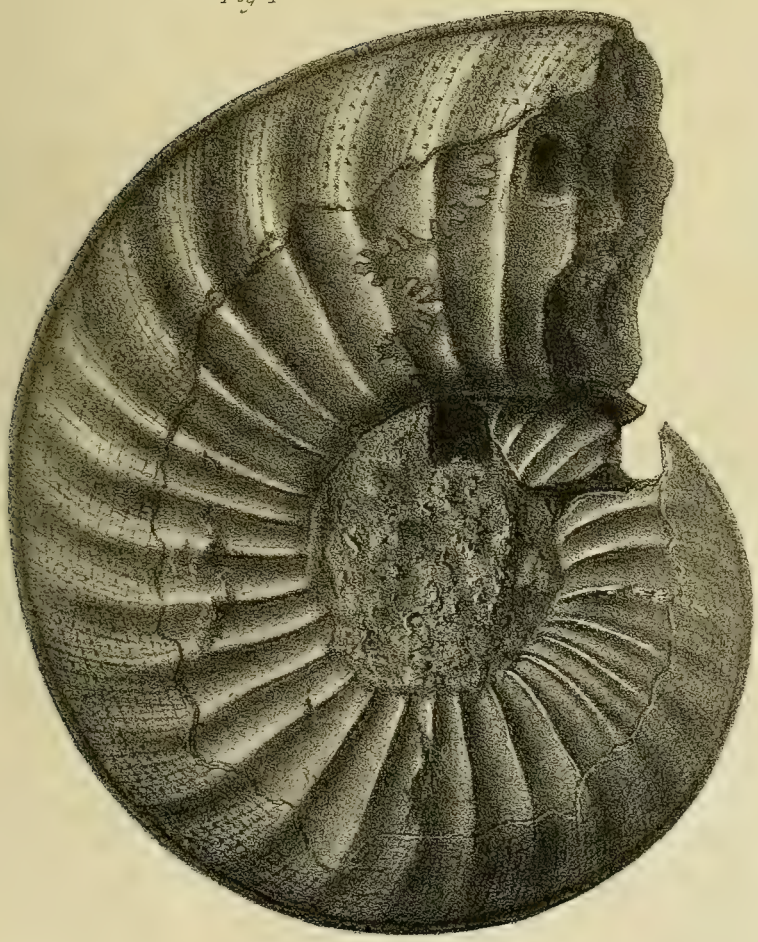
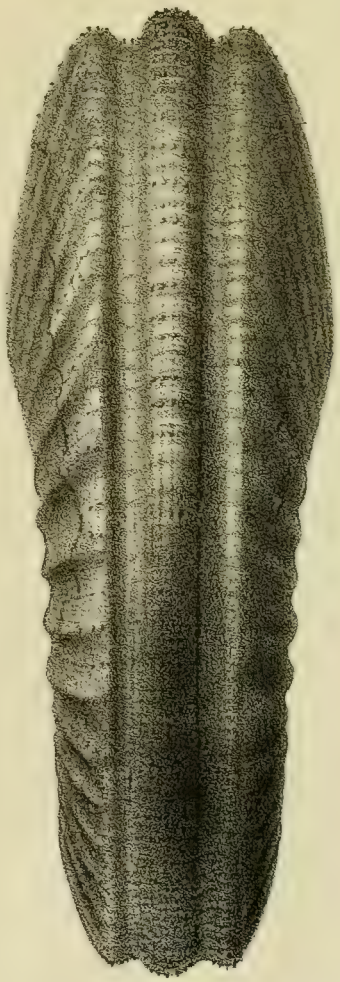


Fig 6

Fig 7.

Fig 1





A.Gawan lith.

Hanhart imp.

PLATE XXII A.

Zone of Amaltheus oxynotus.

Fig. 1. ARIETITES IMPENDENS, *Young & Bird.* Side view, natural size. Woodwardian Museum, Cambridge.

2. — — — Front view of the same shell.

3. — — — Siphonal area of do. do.

4. — — — Young shell with sharp ribs and sulci.

5. — — — The lobe-line magnified.

6. — COLLENOTTII, *d'Orbigny.* Side view, natural size. Woodwardian Museum, Cambridge.

7. — — — Front view of same shell.

8. — — — Siphonal area of do. do.

9. — — — The lobe-line, highly magnified.

Fig 2.

Fig 1

Fig 3

Fig 5

Fig 4.

Fig.9

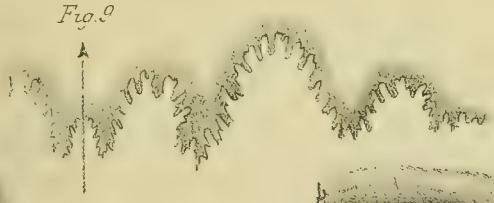


Fig 8

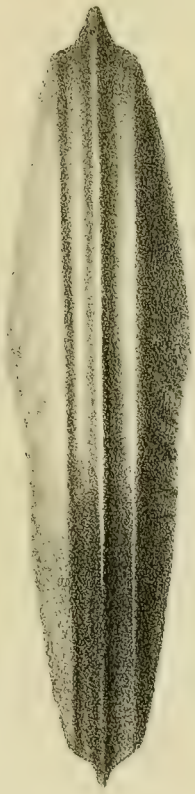


Fig 7.

Fig.6.

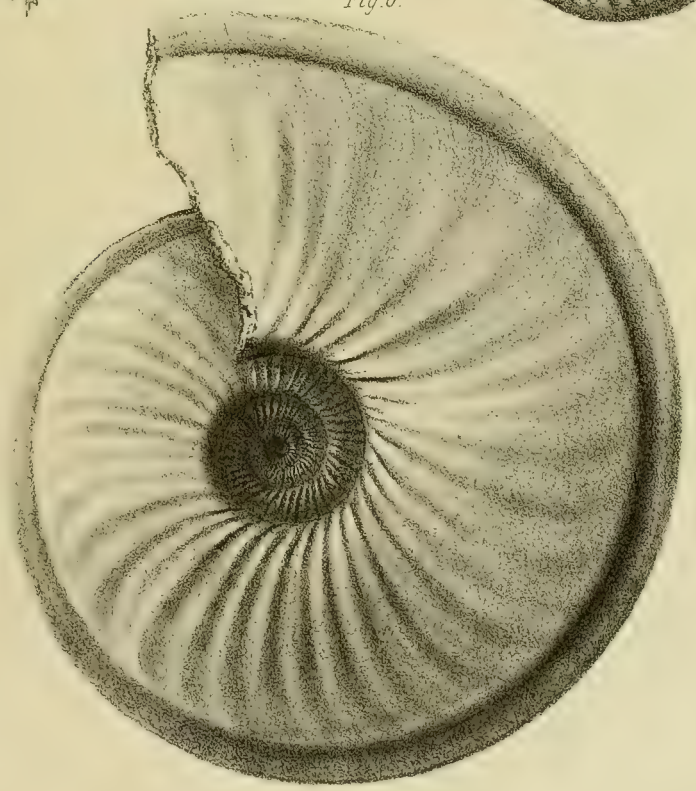


PLATE XXII B.

Zone of Amaltheus oxynotus.

Fig. 1. ARIETITES COLLENOTTII, *d'Orbigny.* Side view, natural size. Woodwardian Museum, Cambridge. The lateral lobes with their numerous digitations, and the saddles with their lobules, are well shown *in sitú* in this specimen, the largest that has been found.

2. — — — Front view of same shell showing the sagittate aperture.

3. — — — Siphonal area, natural size, showing the form of the siphonal lobes filling in the sulci.

Fig 1

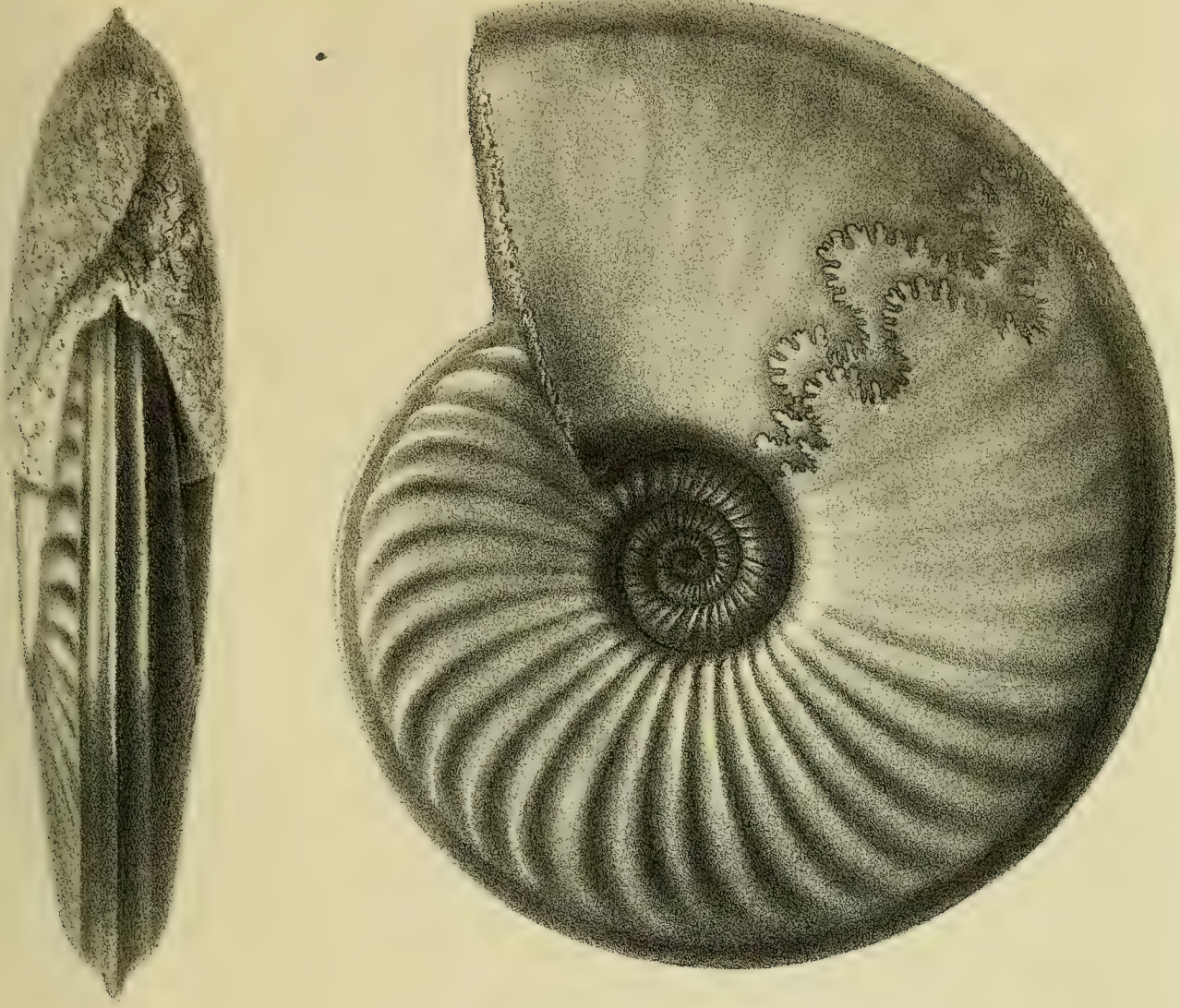
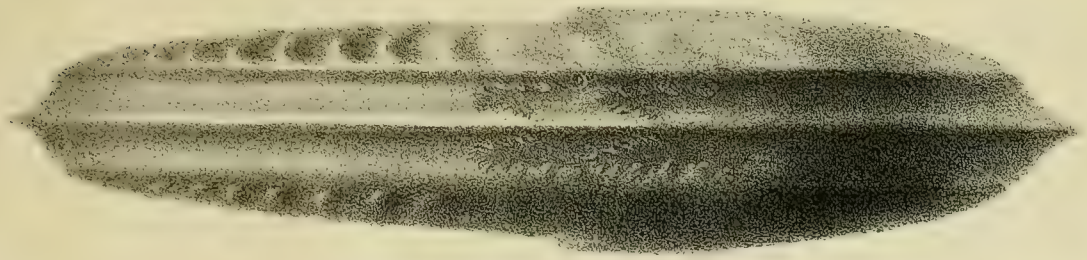


Fig 2.

Fig 3.



J. Sowerby del. et lith.

Hanhart lith. imp.

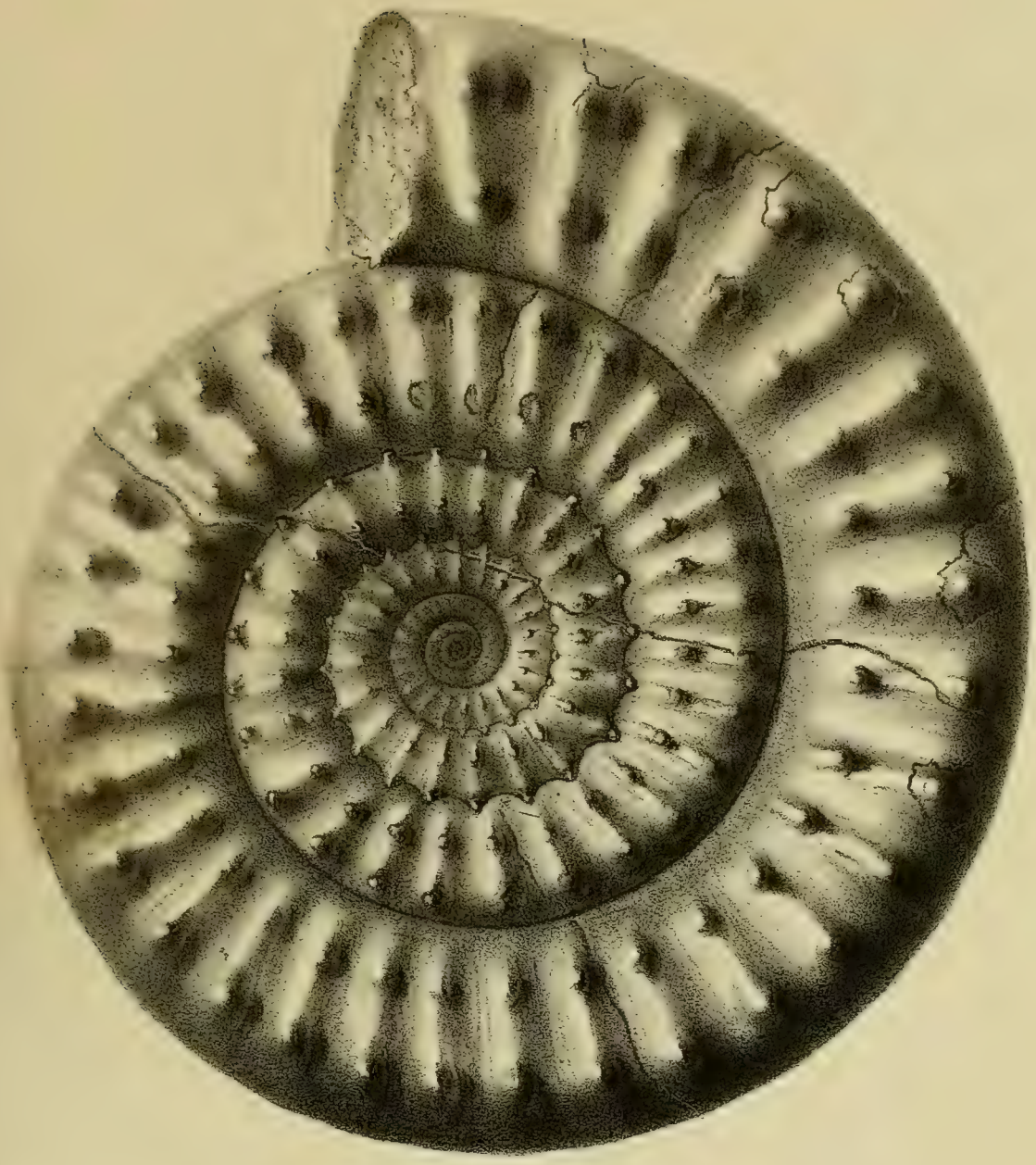
PLATE XXIII.

Zone of the Arietites Bucklandi, superior.

Fig. 1. Aegoceras Birchii, *Sowerby.* Side view, natural size.
2. — — — Siphonal area, showing the fine polytome ribs crossing this area.

In this magnificent specimen in my collection the shell is well preserved throughout, so that the sharpness of the tubercles and the delicacy of the sculpture on the ventral area are well displayed.

Fig 1



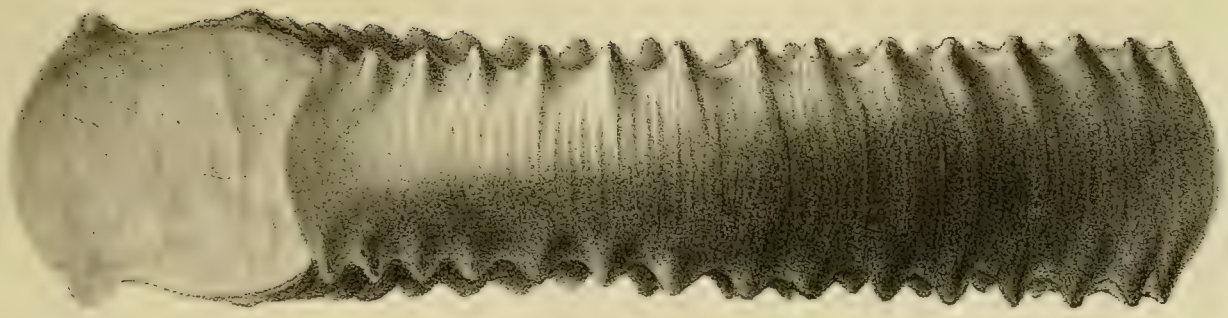


Fig 2

A. Fawan lith.

Hanhart imp.

PLATE XXIV.

Zone of the Arietites Bucklandi, superior.

Fig. 1.	AEGOCERAS PLANICOSTA, *Sow.*	Specimen with ribs and tubercles.
2.	— — —	Smaller shell, showing their growth.
3.	— — —	Siphonal area of a small typical shell.
4.	— — —	Do. do. showing growth of spines.
5.	— — —	This specimen shows that in middle age the spines and ribs become relatively less.
6.	— — —	Another shell showing curved spines.
7.	— — —	Do. do. excessive growth of do.
8.	— — —	Abnormal growth of ribs and tubercles.

The three last fossils appear to represent the *Am. ziphius*, Ziet. All the specimens are in my collection, and were collected as types out of a considerable number of fossils of the same species at Lyme Regis some years ago, and all are now drawn for the first time.

Fig 8.

Fig. 1.

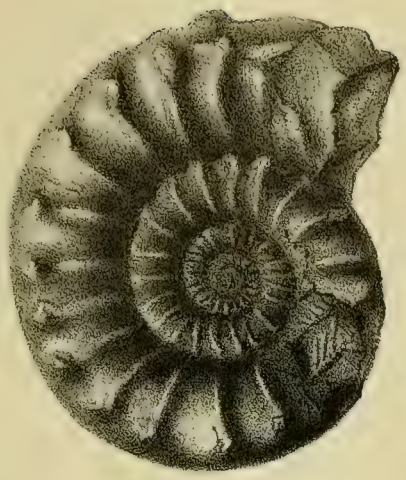


Fig 2

Fig 3.

Fig 4.

Fig. 5.

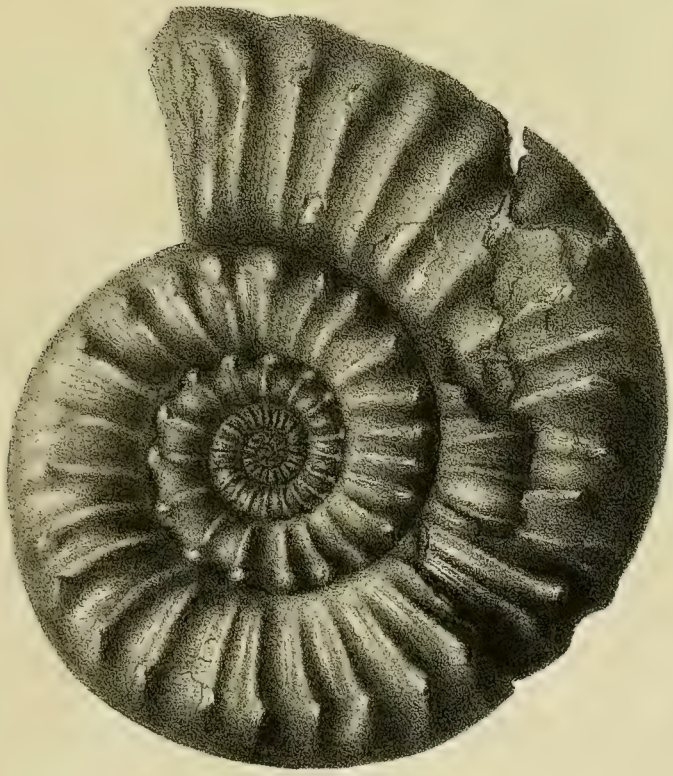


Fig. 6.

Fig. 7

Mary Suft lith.

Hanhart imp

PLATE XXV.

Zone of Arietites Bucklandi, superior.

Fig. 1. AEGOCERAS PLANICOSTA, *Sowerby*. Natural size. This specimen represents a large AM. DUDRESSIERI, *d'Orbigny*, which is in reality the adult form of AEGOCERAS PLANICOSTA, *Sow.* This magnificent specimen belongs to the Royal School of Mines, and was collected at Lyme Regis.

2. — — — A portion of the outer lamina of the shell, showing lines and perforations highly magnified.

3. — — — Showing parallel lines formed by a fine punctated surface.

Fig 1.

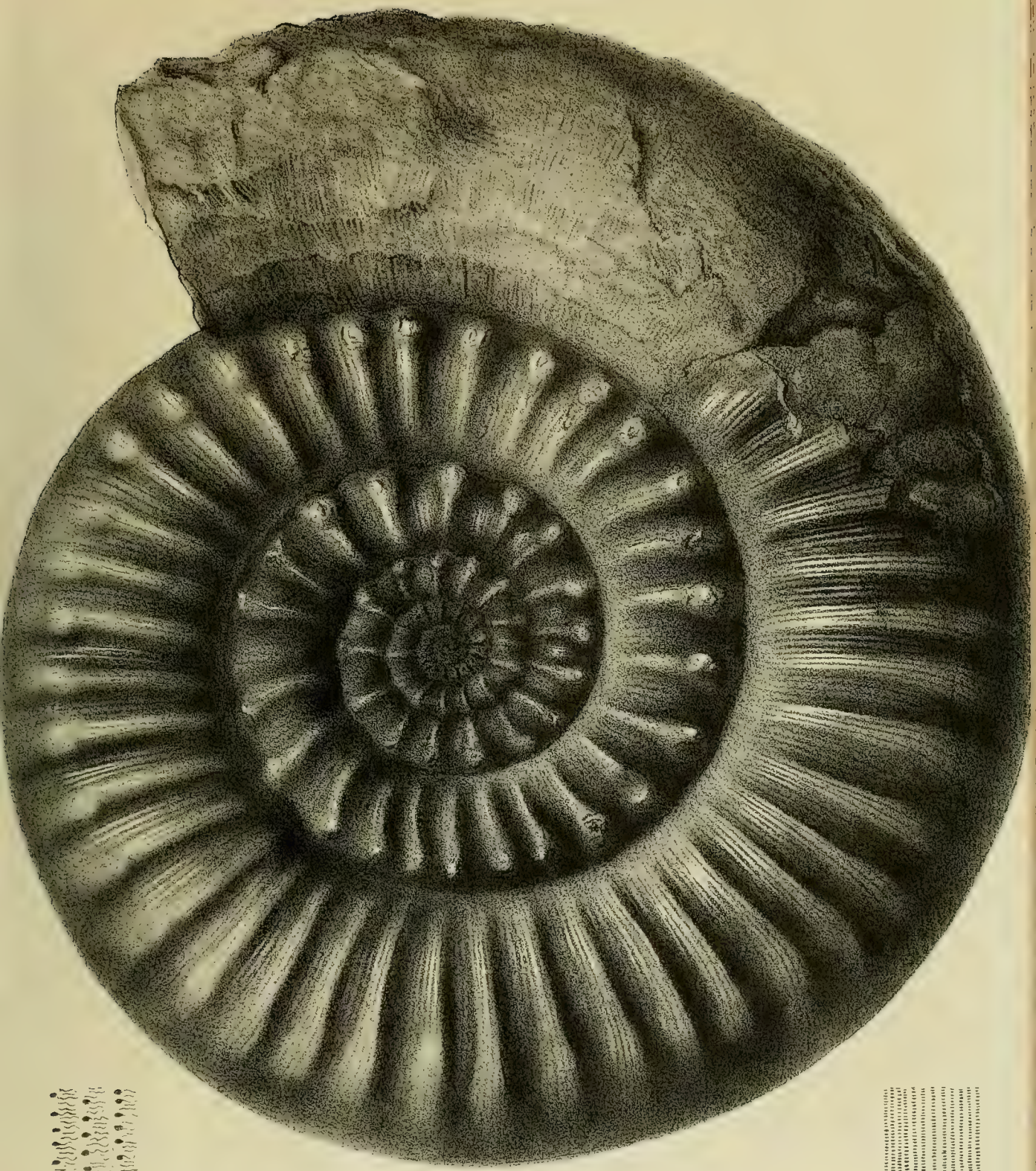


Fig 2

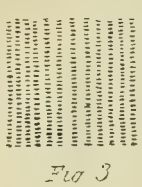


Fig 3

PLATE XXVI.

Zone of Arietites raricostatus.

Fig. 1.	Aegoceras biferum, *Quenstedt.*	Side view, natural size. My collection.
2.	— — —	Front view, magnified twice.
3.	— — —	Siphonal area do.
4.	— — —	Side view, showing wing-like ribs, magnified.
5.	Arietites raricostatus, *Zieten.*	Small shell, natural size. My collection.
6.	— — —	Siphonal view, magnified twice.
7.	— — —	Front do. do.
8.	— — —	Side view, natural size. My collection.
9, 10.	— — —	Front and siphonal views of do.
11.	— — —	Side view, natural size. My collection.
12.	— — —	Do. do. showing the distance of the septa from each other. My collection.
13.	— — —	Front view of same shell.
14.	— — —	Siphonal area of do.

Fig. 6

Fig. 7

Fig. 5

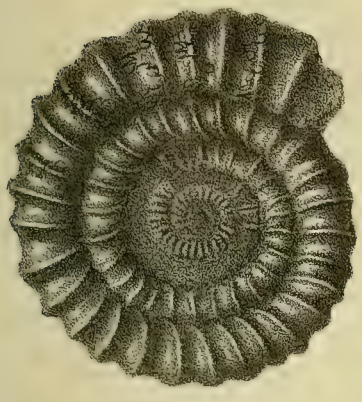
Fig. 1

Fig. 2

Fig. 3

Fig. 11.

Fig. 8



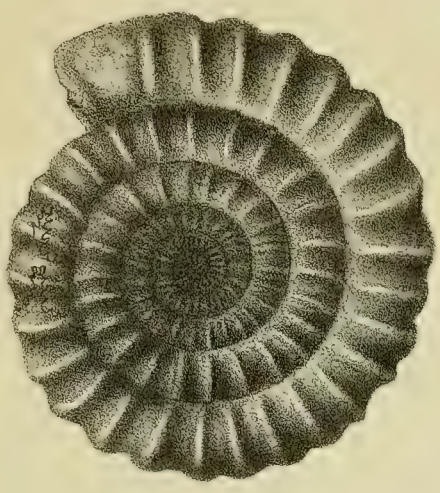


Fig. 4

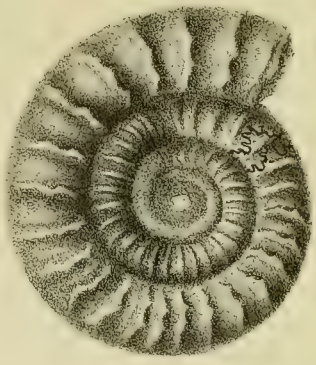


Fig. 9.

Fig. 10

Fig. 12

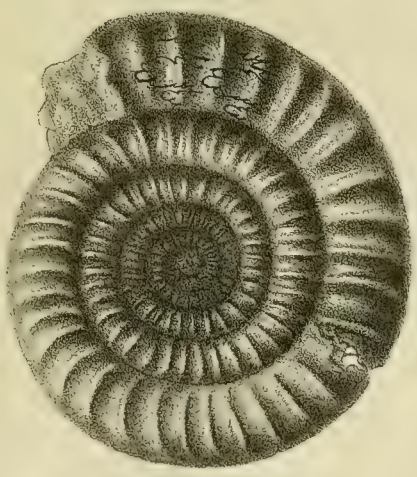


Fig. 13.

Fig. 14

Mary Suft lith.

Hanhart imp

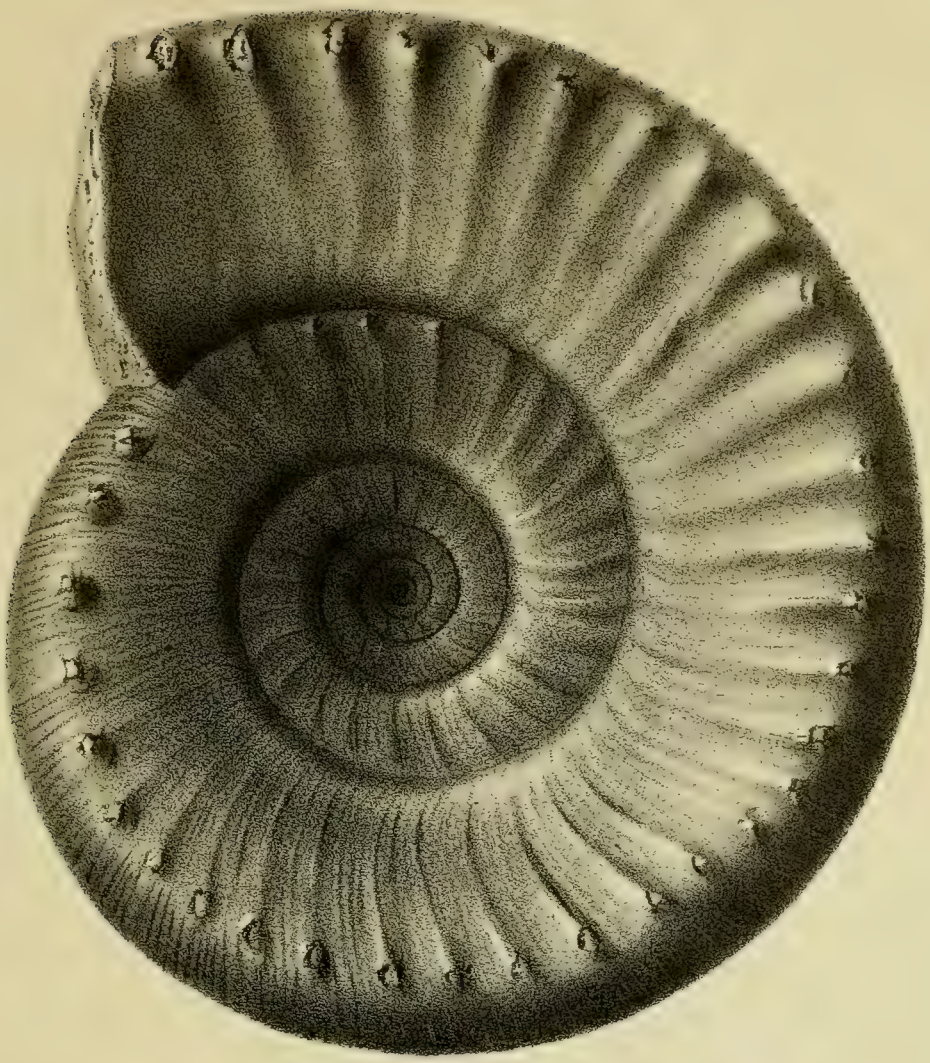
PLATE XXVII.

Zone of Aegoceras armatum.

Fig. 1. AEGOCERAS SUBMUTICUM, *Oppel.* Lateral view, natural size, showing the regularity of the ribs and smallness of the tubercles; likewise the small amount of the involution of the last whorl. My collection.

2. — — — Front view of the siphonal area, showing the tubercles in profile, the squareness of the siphonal area, and the numerous small ridges that cross the area between the larger folds.

Fig 1



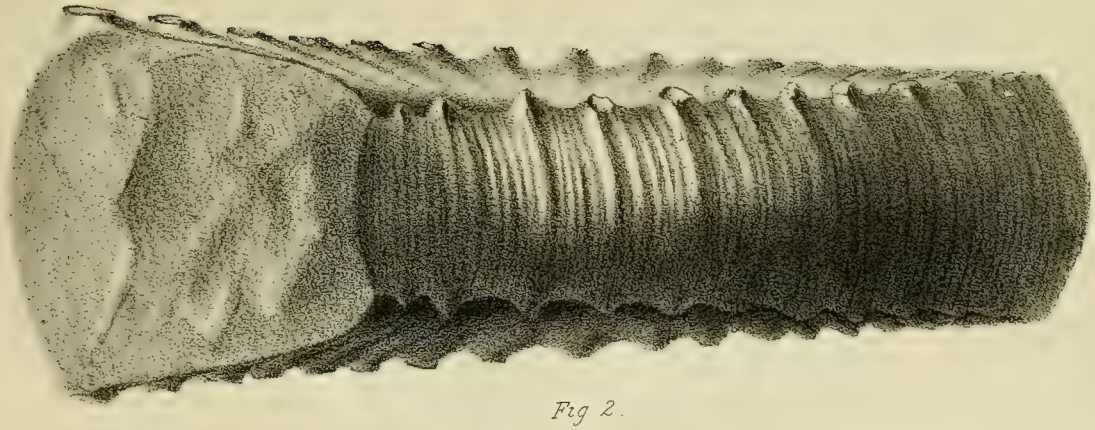


Fig 2.

A Gawan lith

Hanhart imp

PLATE XXVIII.

Zone of Aegoceras armatum.

Fig. 1. AEGOCERAS ARMATUM, *Sowerby*. Side view, natural size. A very fine type specimen. Leckenby collection. Woodwardian Museum, Cambridge.

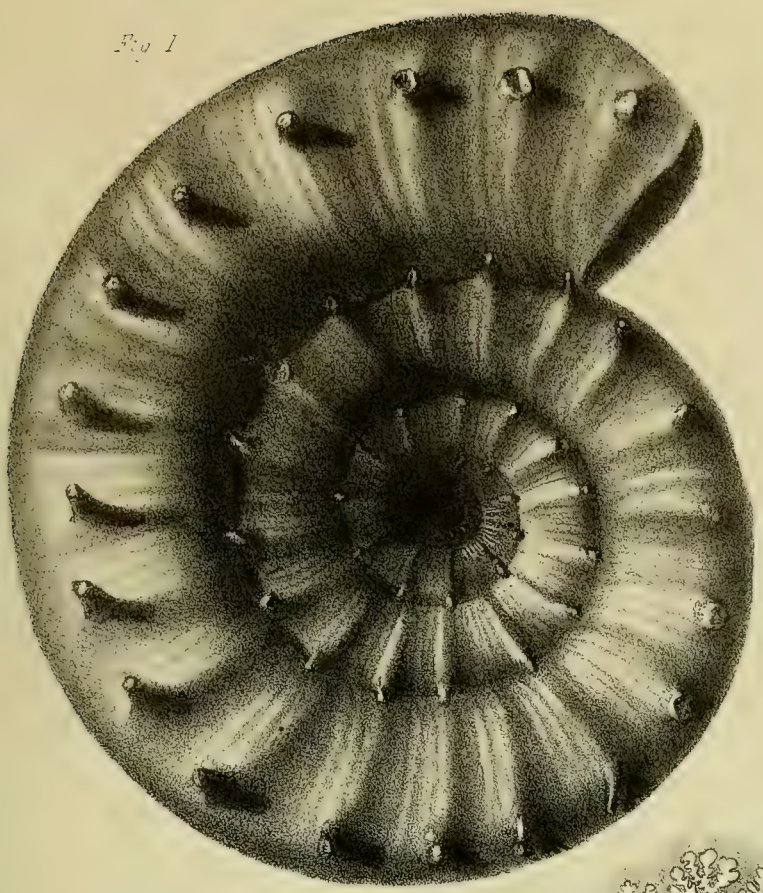
2. — — — Front view, showing the ribs and spines in profile.

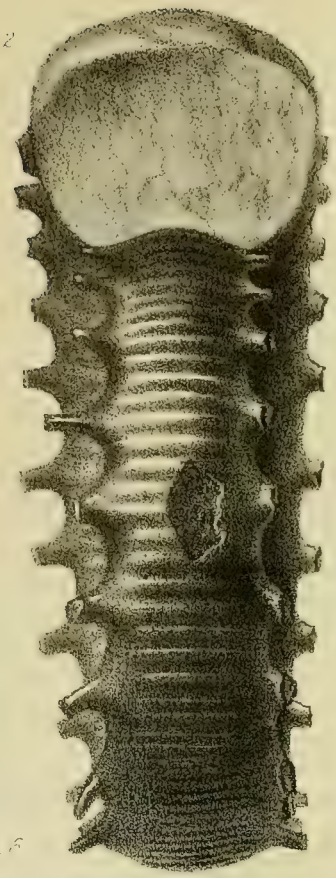
3. — — — Smaller specimen in same collection.

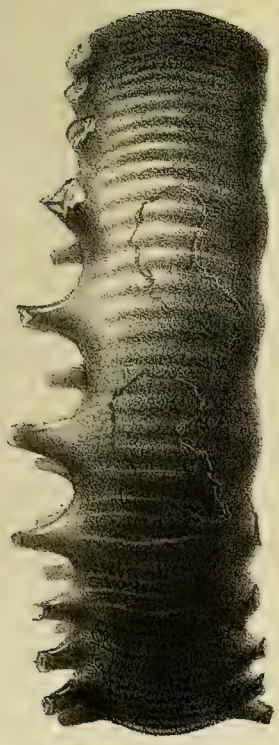
4. — — — Siphonal area, showing spines of the left side absent.

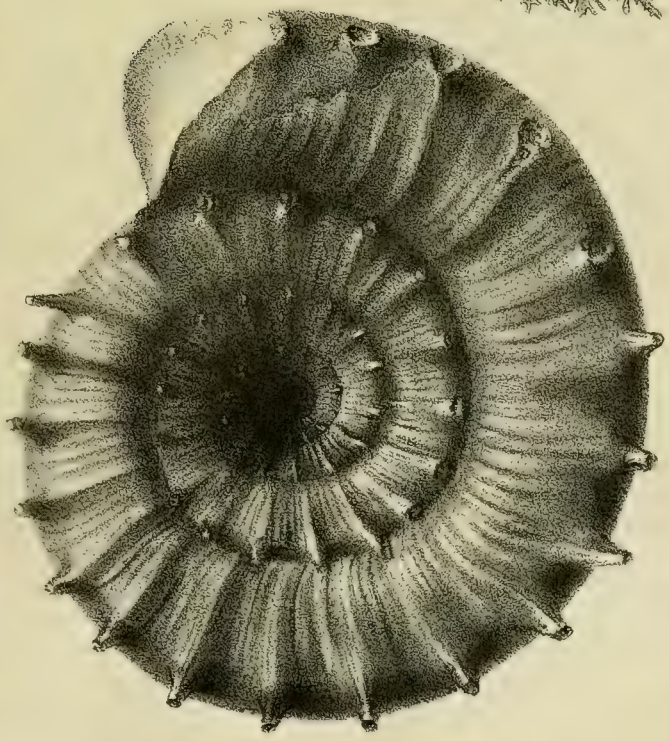
5. — — — Another specimen, showing spines of the left side truncated. My collection.

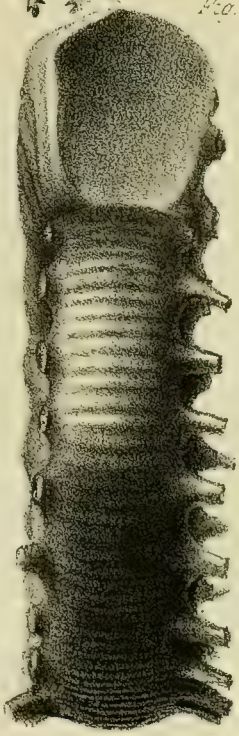
6. — — — A very accurate tracing from another specimen of the highly complicated lobe-line, showing the large size of the siphonal and principal lateral lobes. My collection.











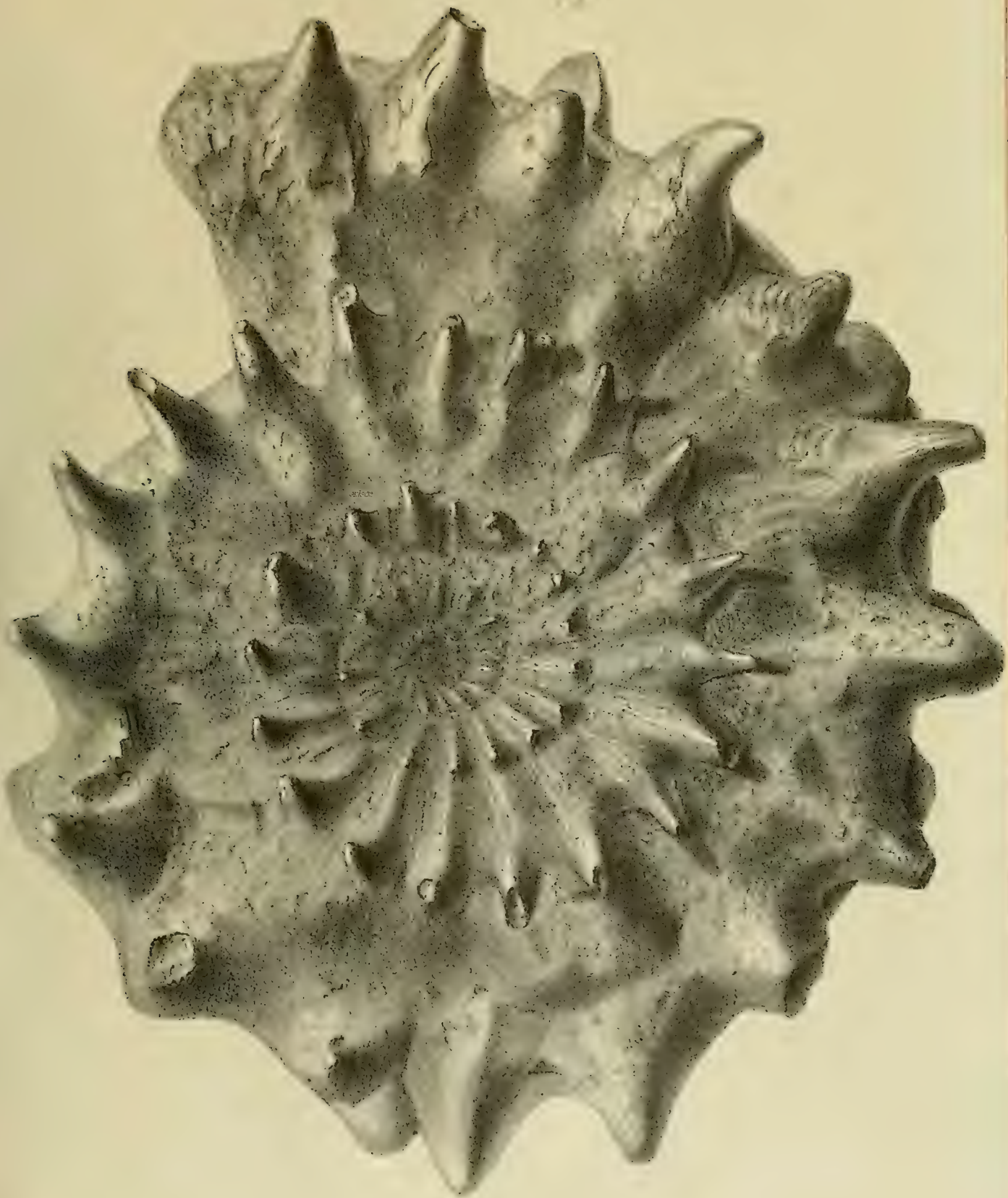
A.Gawan lith.

Hanhart imp.

PLATE XXIX.

Zone of Aegoceras armatum.

AEGOCERAS ARMATUM, *Sowerby.* An aged specimen, natural size, showing the large dimensions of the spines on the body-chamber and the comparative smallness of the spines on the inner whorls. This specimen was obtained at Lyme Regis thirty years ago, and was long the adornment of a private collection. It now belongs to the Museum of the Royal School of Mines, and I have the pleasure of having it figured for the first time.



A.Gawan lith.

Hanhart imp.

PLATE XXX.

Zone of Aegoceras armatum.

Fig. 1. AEGOCERAS LECKENBYI, *Wright.* Lateral view, natural size. Leckenby collection, now in the Woodwardian Museum, Cambridge.

2. — — — Siphonal area, showing the ribbing and the smallness of the tubercles.

3. — — — Front view of the same shell.

4. — — — Another example in the same collection.

5. — — — Front view, showing the lobes.

6. — — — Siphonal area, showing the ribbing and convexity of this area.

7. — — — Accurate tracing of a portion of the lobe-line, showing the narrowness of the siphonal lobe and the magnitude and complication of the principal lateral lobes.

Fig 2

Fig. 1.

Fig 3

Fig 7

Fig. 6.

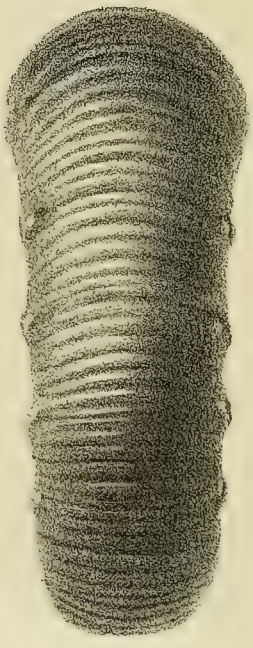


Fig 5.

Fig. 4

PLATE XXXI.

Zone of Aegoceras Henleyi.

Fig. 1. AEGOCERAS DAVŒI, *Sowerby.* Lateral view, natural size. Woodwardian Museum, Cambridge. Leckenby collection.

2. — — — Siphonal area, natural size, of the same shell.

3. — CURVICORNUM, *Schlöenbach.* Siphonal area, natural size. My collection.

4. — — — Lateral view, natural size, same shell.

Zone of Aegoceras Jamesoni.

5. — TAYLORI, *Sowerby.* Lateral view, natural size. Lyme Regis. In my collection.

6. — — — Siphonal area, showing the double row of tubercles on this area.

7. — — — Front view of the same shell.

Fig 1

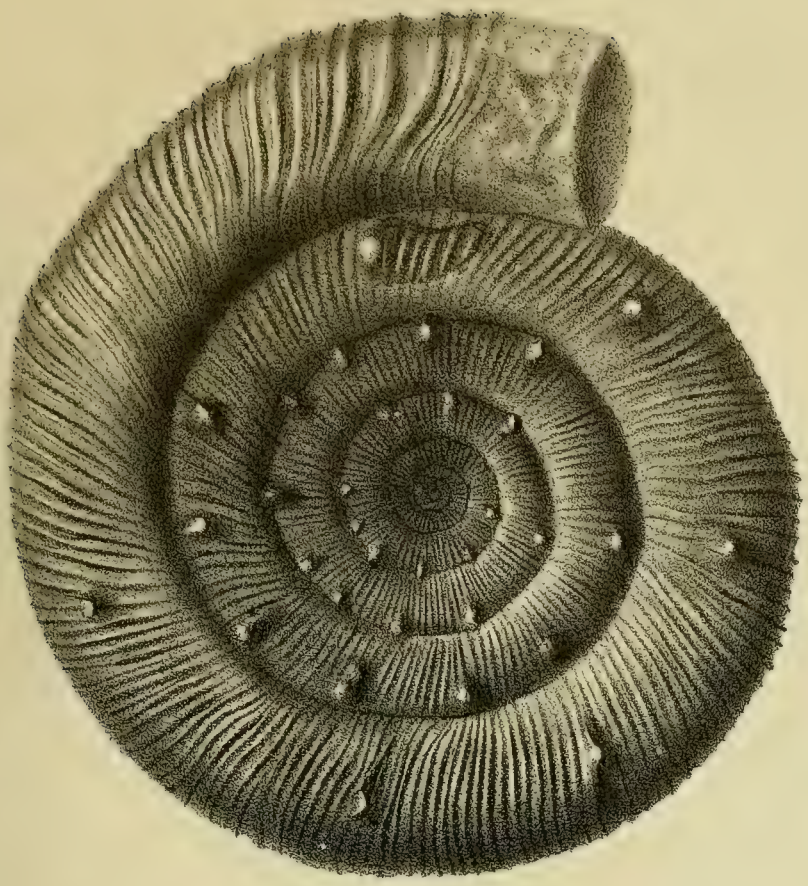


Fig 2

Fig 5.

Fig 6.

Fig 7.

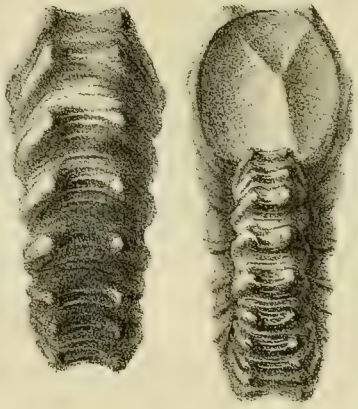


Fig. 3.

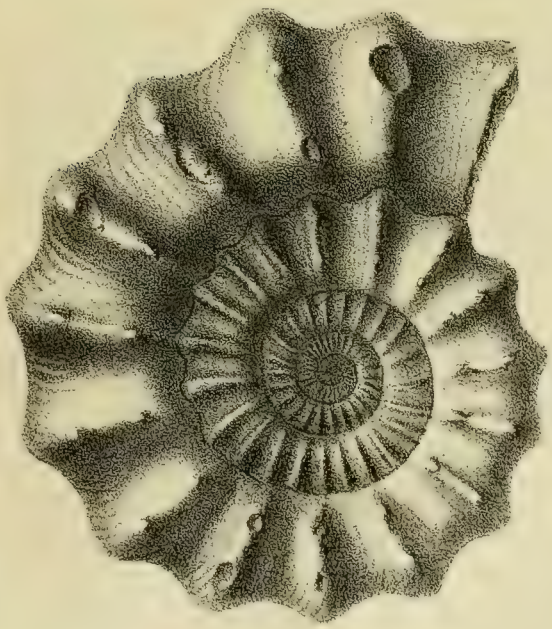


Fig 4.

PLATE XXXII.

Zone of Aegoceras Henleyi.

Fig. 1. AEGOCERAS LATECOSTA, *Sowerby.* Lateral view, natural size, from the original type specimen in the Sowerbian collection. British museum. This fossil is the middle-aged condition of *Aegoceras Henleyi* before the transformation takes place (see Pl. XXXIII).

2. — BREVISPINA — Lateral view, natural size. Original type. Sowerbian collection, British Museum.

3. — — — Siphonal area of the same, showing the ventral row of short spines.

4. — — — Accurate tracing of the lobe-line.

5. — BIRCHII — Small shell, showing details. My collection.

6. — — — Front view, showing spines in profile.

7. — — — Accurate tracing of the lobe-line, showing the smallness of the siphonal lobe and the magnitude of the principal lateral lobes.

8. — — — Young forms of this species. The series is intended to show, in connection with Pl. XXIII, that *Aegoceras Birchii* maintained its original form and structure through the various phases of its life.

Fig 1

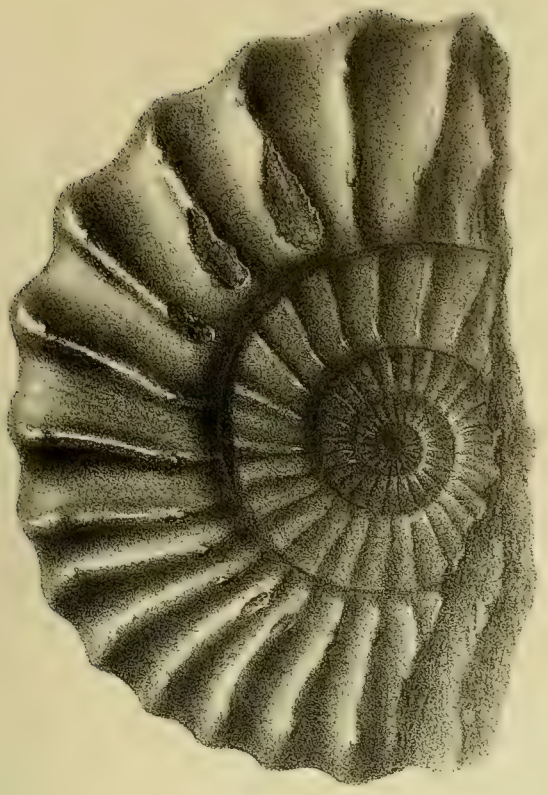


Fig. 2.

Fig 3

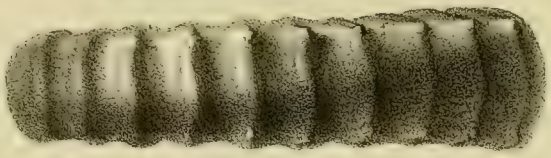


Fig 4

Fig 5

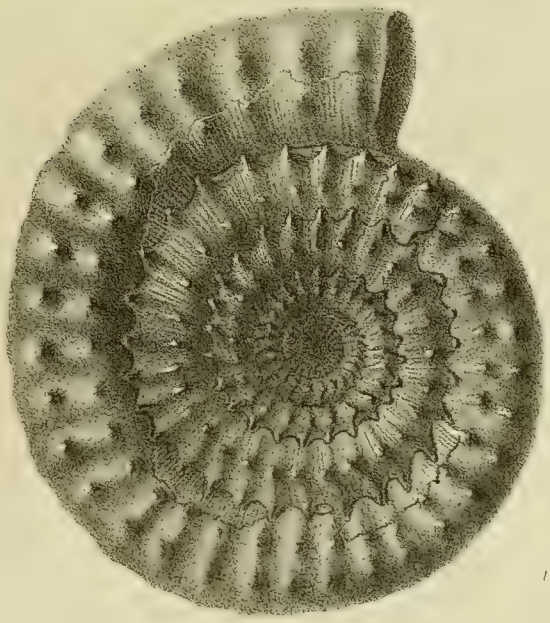


Fig 6

Fig. 7.

Fig. 8

PLATE XXXIII.

Zone of Aegoceras Henleyi.

Fig. 1. Aegoceras Henleyi, *Sowerby*. Lateral view of a perfect specimen, showing the change of form which took place in middle-age period of this remarkable species.

2. — — — Front view of the same shell.

3. — — — Siphonal area of the same shell.

The outer whorl of this fossil is the true *Ammonites Henleyi*, Sow., 'Min. Conchology,' pl. clxxii, and the inner whorls here *in sitû* in this rare specimen are clearly the *Ammonites latecosta*, Sow., 'Min. Conchology,' pl. dlvi, fig. 2. This specimen I obtained several years ago from the green Ammonite bed, near Charmouth, Dorsetshire, and since I have had three other less perfect specimens from the same stratum, all, however, show the same anatomical characters which are so well displayed in the beautiful drawing Mr. Gawan has given of this Ammonite.

Fig 1.

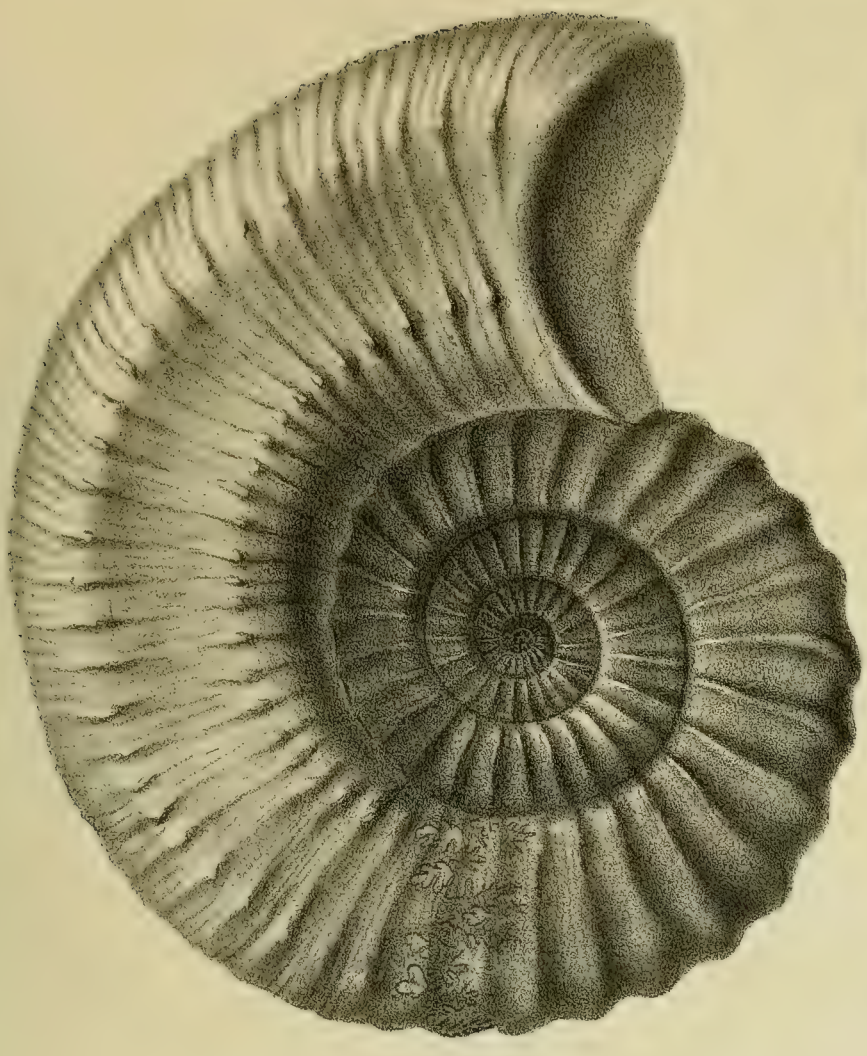


Fig 2.

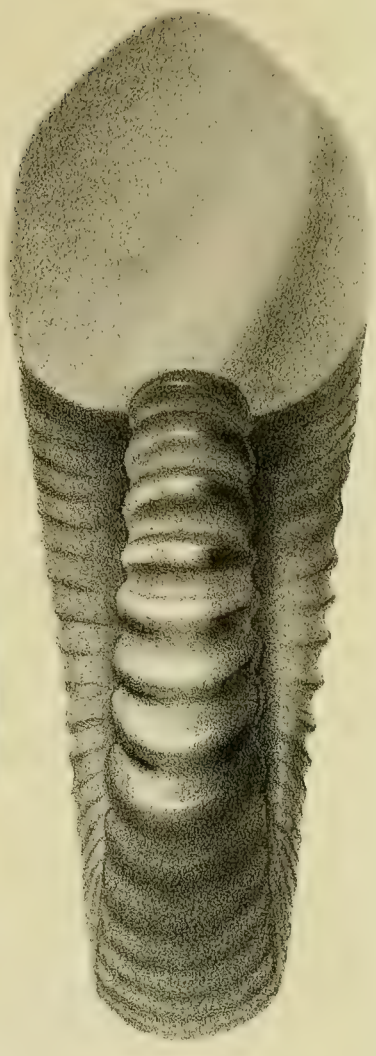


Fig 3.

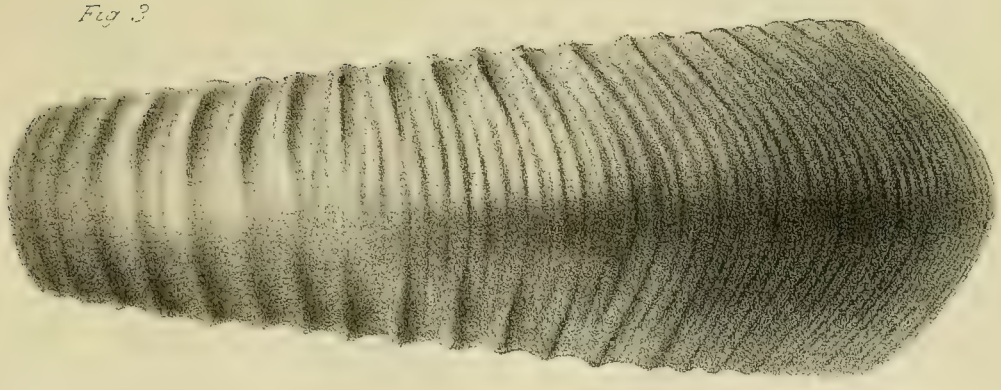


PLATE XXXIV.

Zone of Aegoceras Henleyi.

Fig. 1. AEGOCERAS ~~MACULATUM~~ capricornus Schlotheim. ~~*Young*~~ and ~~*Bird.*~~ Lateral view, natural size. The figures in this plate are arranged to show that *Aeg. maculatum*, Young = *Aeg. capricornum*, Schloth, of the Yorkshire coast, is the immature condition of *Aegoceras heterogenum*, Young and Bird, found in the same beds.

2. — — — Siphonal area of the same shell.

3. — — — Front view of do. do.

4. — — — Specimen in which the transformation scene in the last whorl has been nearly accomplished.

5. — — — Front view of the same fossil.

6. — — — Siphonal area, showing the remarkable change in the ventral area both in width, tubercles, and ribs.

7. — — — Accurate tracing of the lobeline.

8. — — — Do. do. another specimen.

All the specimens figured in this plate belong to the Leckenby collection, Woodwardian Museum, Cambridge.

Fig. 2.

Fig. 4

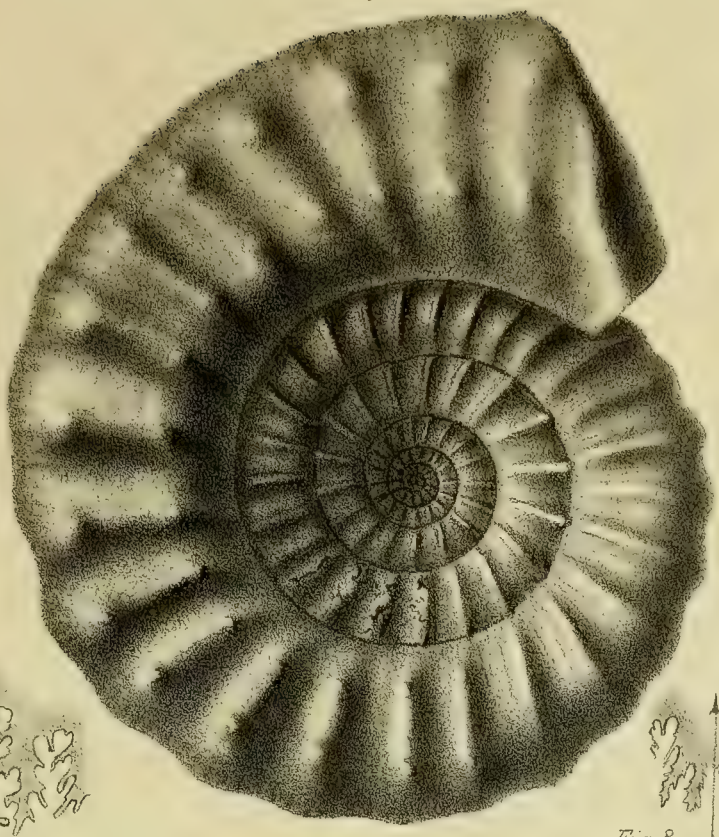


Fig 3.

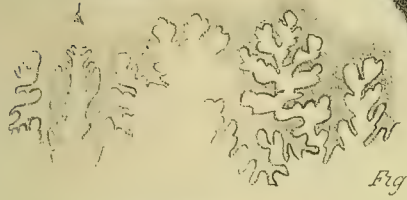


Fig 7

Fig. 8.

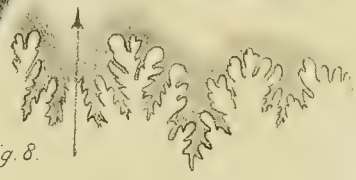


Fig. 5.

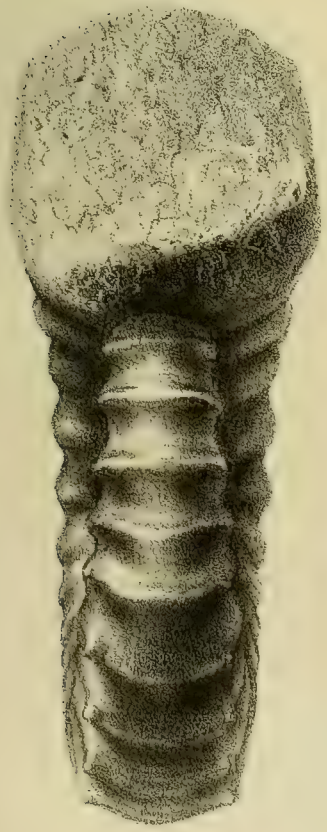


Fig. 1.

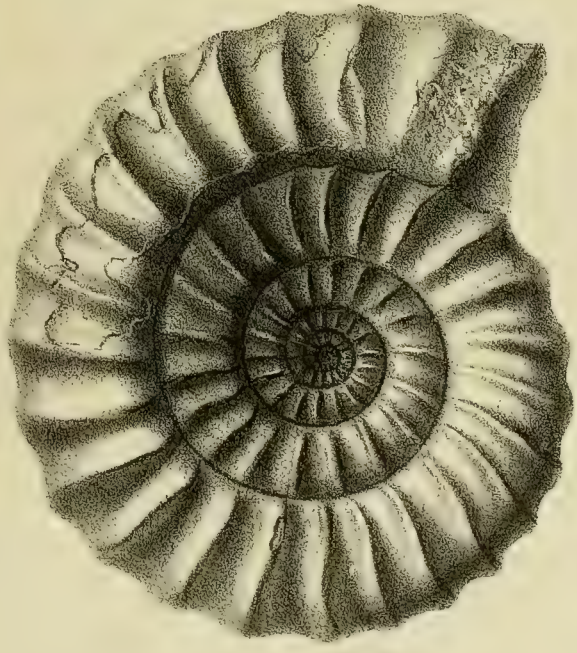


Fig. 6

PLATE XXXV.

Zone of Aegoceras Henleyi.

Fig. 1. AEGOCERAS ACUTICOSTATUM, *Wright.* Lateral view, natural size. Woodwardian Museum, Cambridge.

2. — — — Front view, natural size, showing the biflexion of the ventral ribs.

3. — — — Siphonal area of the same shell.

4. — HETEROGENUM, *Young* and *Bird.* Lateral view, natural size. Woodwardian Museum Leckenby collection.

5. — — — Front view of the same shell.

6. — — — Siphonal area of the same shell, showing the sudden enlargement of the whorl at the commencement of the transformation scene. Natural size.

7. — ACUTICOSTATUM, *Wright.* Lobe-line, showing simple ramifications.

Fig 2

Fig 1.

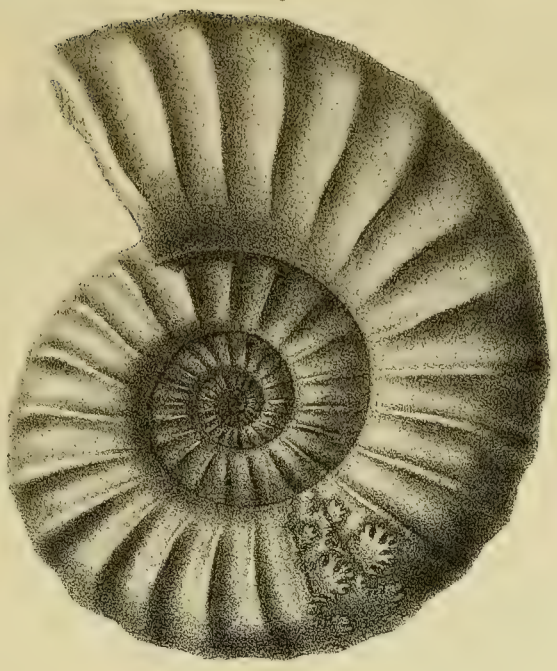


Fig. 3

Fig 5

Fig 7

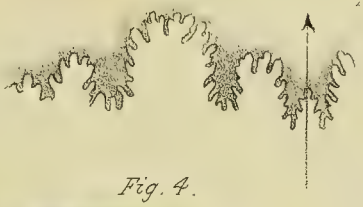


Fig 6.

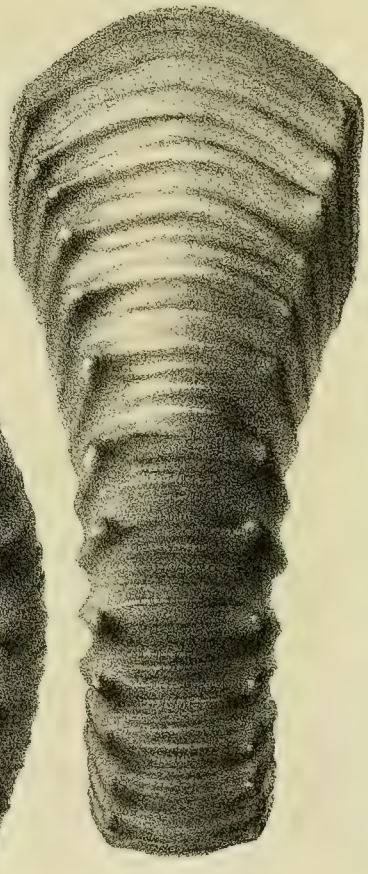
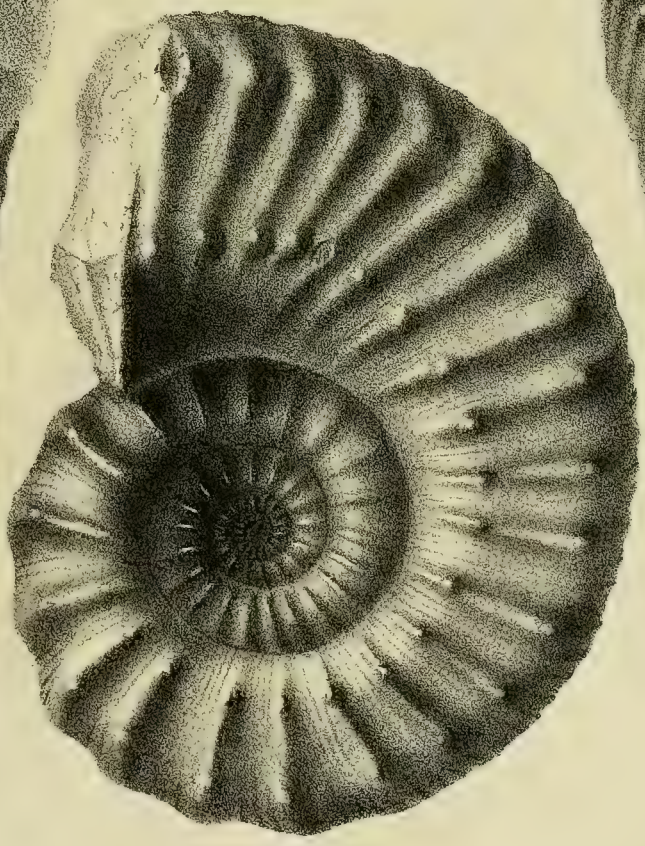


Fig. 4.



A.Gawan lith.

Hanhart imp.

PLATE XXXVI.

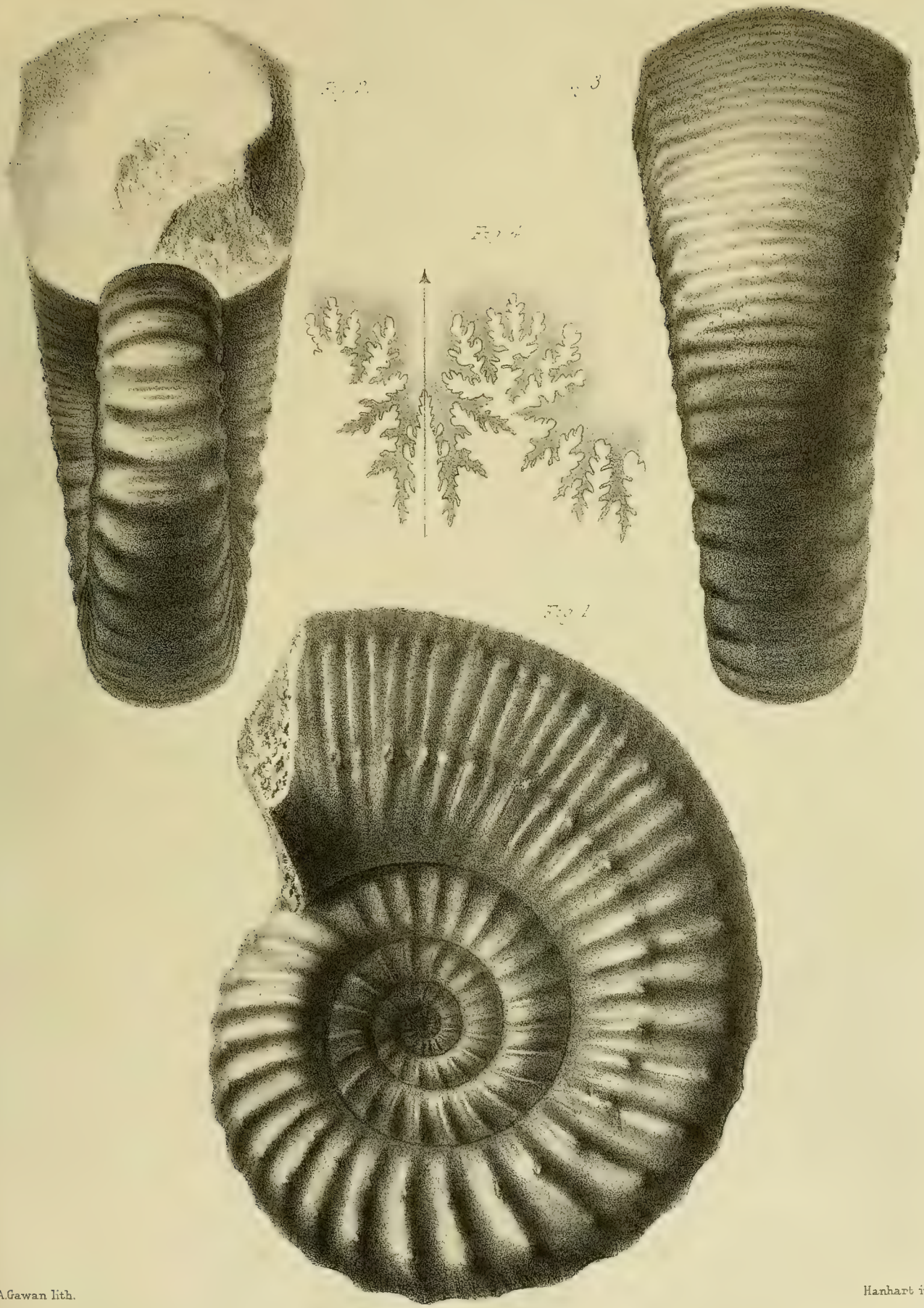
Zone of Aegoceras Henleyi.

Fig. 1. AEGOCERAS HETEROGENUM, *Young* and *Bird.* Lateral view, natural size. My collection.

2. — — — Front view of the same fossil.

3. — — — Siphonal area of the same.

4. — — — Accurate tracing of the complicated lobe-line, showing the large siphonal lobe and the larger principal lateral lobes in an example of this species, collected from the Marlstone of the Yorkshire coast.



A.Gawan lith.

Hanhart imp.

PLATE XXXVII.

The following species are from different zones.

Fig. 1. Aegoceras Maugenesti, *d'Orbigny*. Lateral view, natural size. My collection from the Ibex zone.

2. — — — Front view, showing spines do.

3. Arietites nodotianus — Lateral view, natural size. This is General Portlock's type specimen of his *Ammonites Macdonelli*, Dublin Museum of the Geological Survey of Ireland.

4. — — — Front view of same, showing keel.

5. Aegoceras pettos, *Quenstedt*. Lateral view, magnified. From the collection of the Rev. Samuel Lucas, F.G.S.

6. — — — Siphonal area, showing the deep ribbing.

7. — — — Front view of the same fossil.

8. — gagateum, *Young* and *Bird*. Lateral view, natural size. My collection.

9. — — — Front view, with ribs on ventral area of same, natural size.

10. — Milleri, *Wright*. Ventral area, showing the singular shell texture of this species. Collected at Pabba by Professor A. Geikie, F.R.S. My collection.

11. — — — Lateral view of the same, showing the position of the lateral tubercles.

Fig. 1.

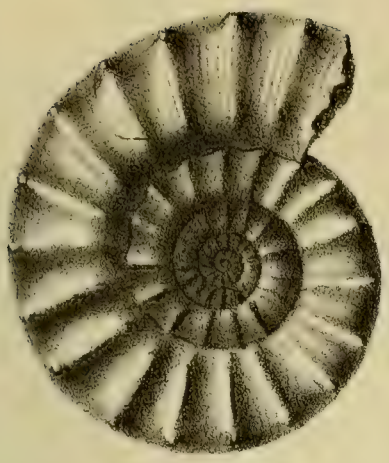


Fig. 2

Fig. 3.

Fig 4.

Fig. 5.

Fig. 6.

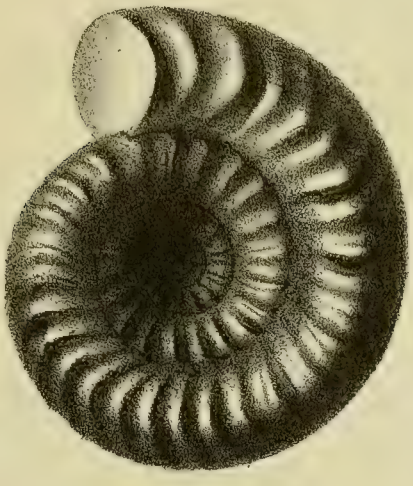


Fig 7.

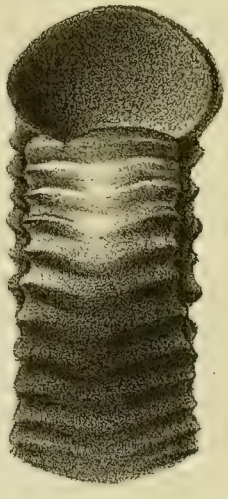


Fig. 10

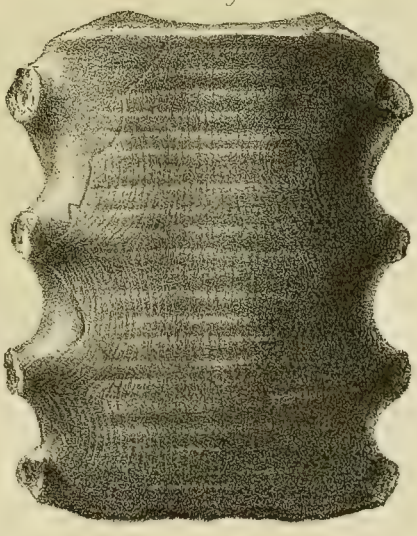


Fig 11.

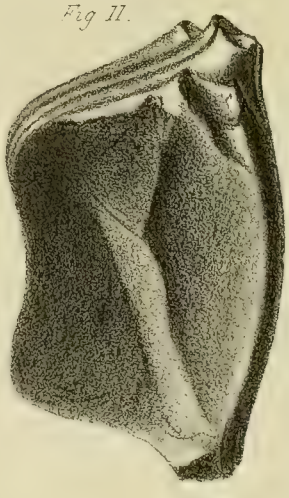


Fig. 8.

Fig 9.

A Jawan lith

Hanhart imp

PLATE XXXVIII.

Zone of Aegoceras Ibex.

Fig. 1. AEGOCERAS VALDANI, *d'Orbigny.* Lateral view, natural size. In collection of Mr. Charles Moore, F.G.S., Bath.

2. — — — Front view of siphonal area do.

3. — — — Body-chamber with aptychus *in sitû.* My collection.

4. — — — Lobes and saddles of this species magnified.

5. — DENSINODUM, *Quenstedt.* Lateral view, natural size, showing the remarkable inflated mouth-border of this species from near Yeovil. My collection.

6. — — — Siphonal area, showing its flatness and the lateral position of the short spines.

Fig 2.

Fig 1

Fig 3

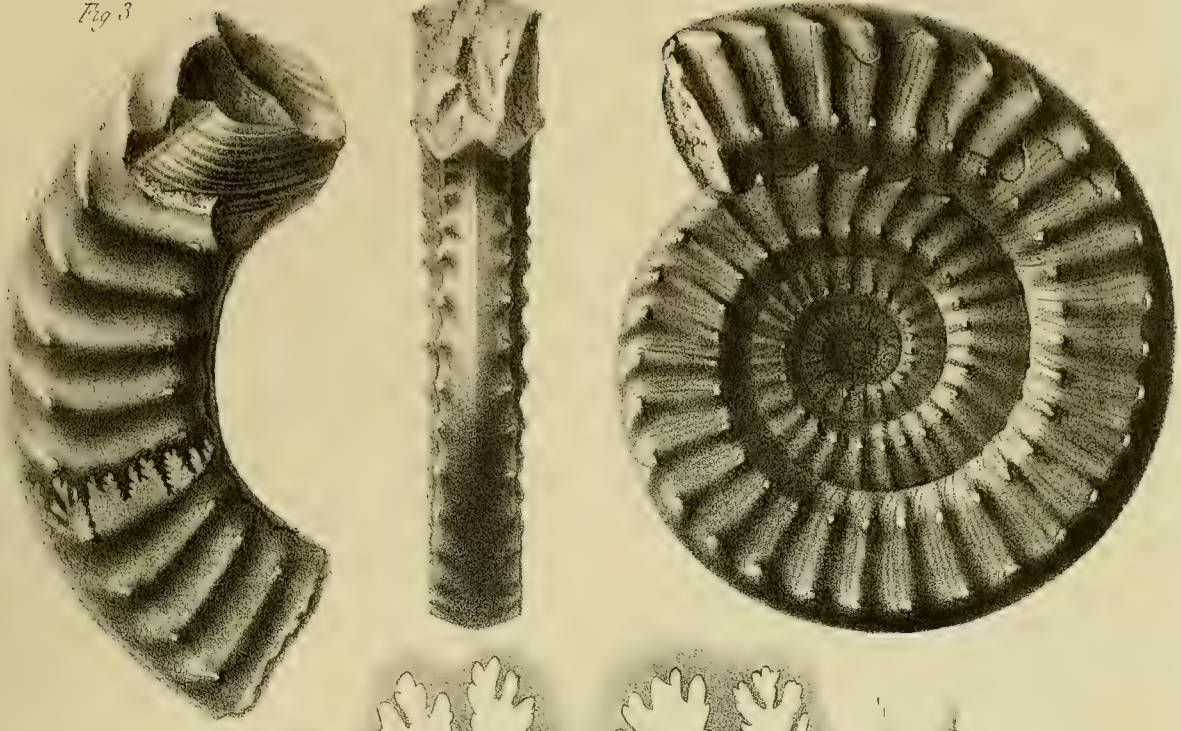


Fig 5.

Fig 6

Fig 4.

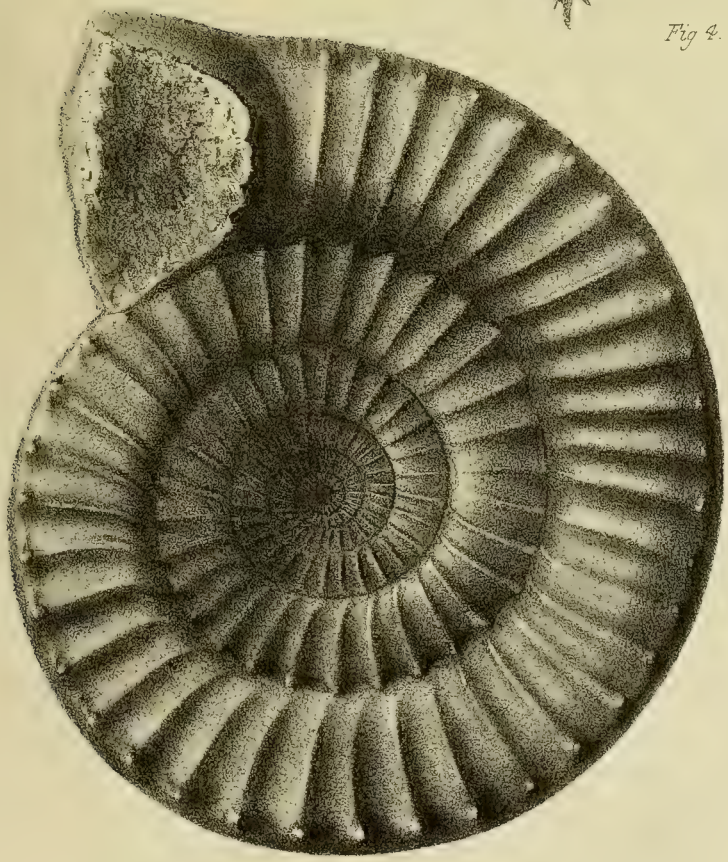


PLATE XXXIX.

Zone of Aegoceras Ibex.

Fig. 1. AEGOCERAS LOSCOMBI, *Sowerby.* Lateral view of a strongly ribbed specimen, natural size.

2. — — — Siphonal area, showing prominent ribs do.

3. — — — Another specimen of the same species.

4. — IBEX, *Quenstedt.* Lateral view, magnified.

5. — — — Another specimen with definite ribbing.

6. — DENSINODUM, *Quenstedt.* Lateral view, natural size.

7. — — — Front view of the same.

8. — — — Lateral view of another specimen, with an additional row of tubercles.

9. — — Siphonal area of the same, showing ribs and spines.

10. — — Lobe-line of this species. The siphonal shorter than the principal lateral lobe, which is split up into many divisions.

All the specimens figured in this plate belong to my collection.

Fig 1.

Fig. 2.

Fig 3.

Fig. 4

Fig. 5

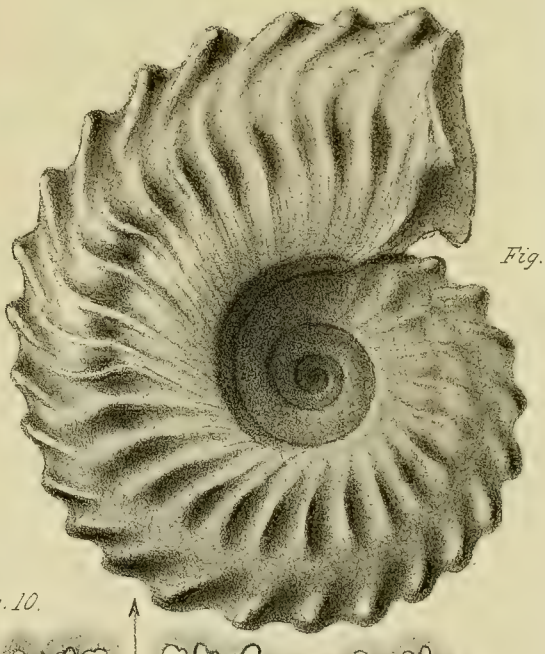


Fig. 10.

Fig. 6.

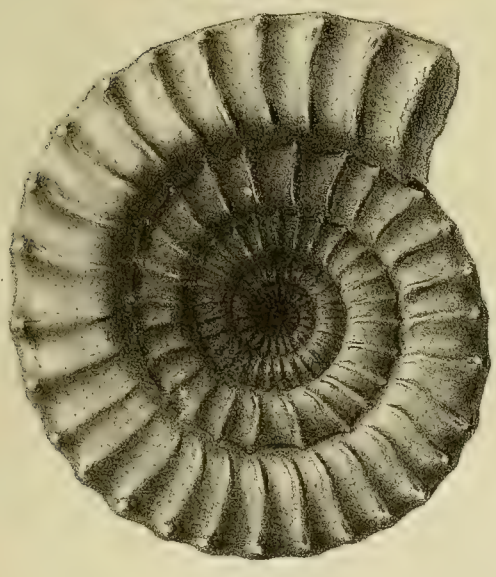


Fig. 7.

Fig. 9.

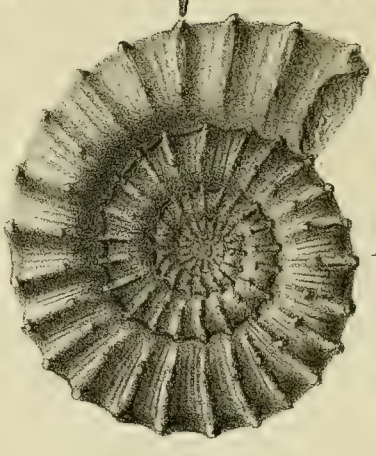


Fig. 8.

A.Cawan lith.

Hanhart imp.

PLATE XL.

Zone of Aegoceras Jamesoni.

Fig. 1. AEGOCERAS POLYMORPHUM, *Quenstedt.* Lateral view, magnified two diameters. In the collection of the Rev. J. E. Cross, F.G.S.

2. — — — Siphonal area, front view do.

3. — — — Simple lobe-line of this form do.

Zone of Aegoceras Ibex.

4. PHYLLOCERAS LOSCOMBI, *Sow.* Lateral view, natural size. My collection. From Charmouth, Dorset.

5. — — — Front view of siphonal area do.

Fig. 1

Fig. 2

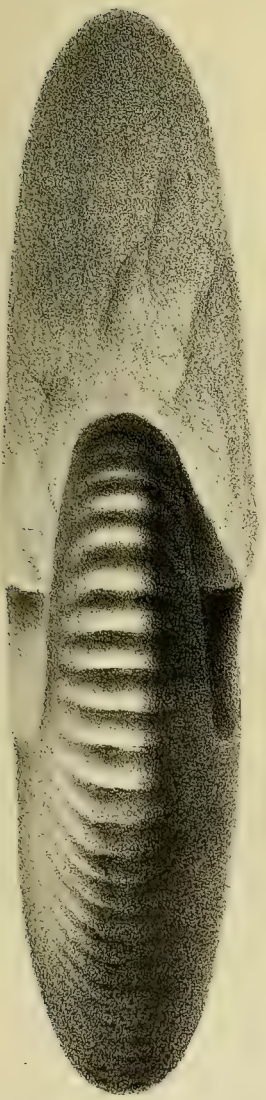
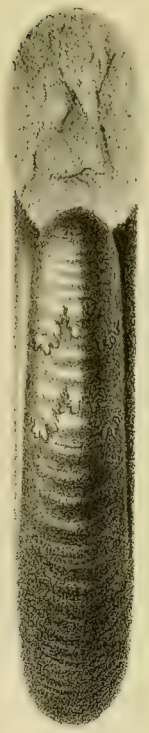
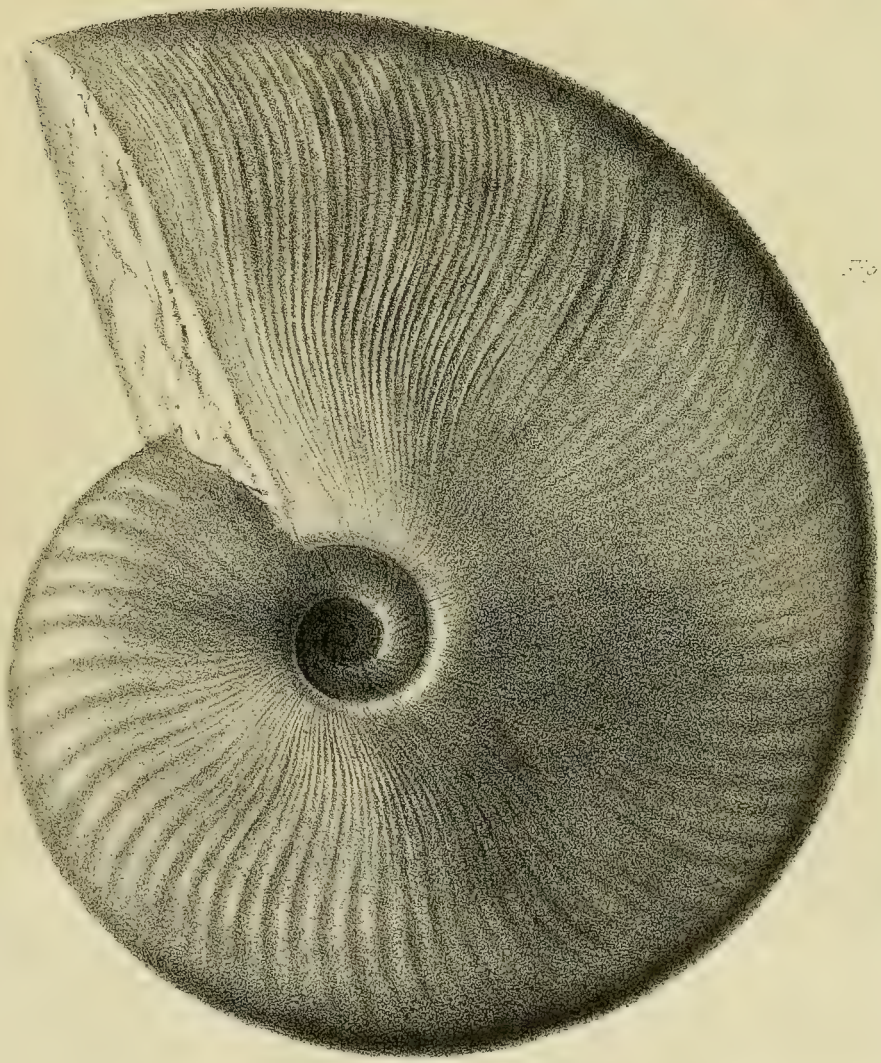


Fig. 3

Fig. 4





A. Gawan lith.

Hanhart imp

PLATE XLI.

Zone of Aegoceras Henleyi.

Fig. 1. AEGOCERAS BECHEI, *Sowerby*. Side view, natural size. My collection.
2. — — — Front view of the same specimen.
3. — — — Side view of a smaller shell, showing sculpture.
4. — — — Siphonal area of the same fossil.
5. — — — Lobe-line, showing the extremely ramified lobes and saddles of this Ammonite.

Fig 3

Fig 2

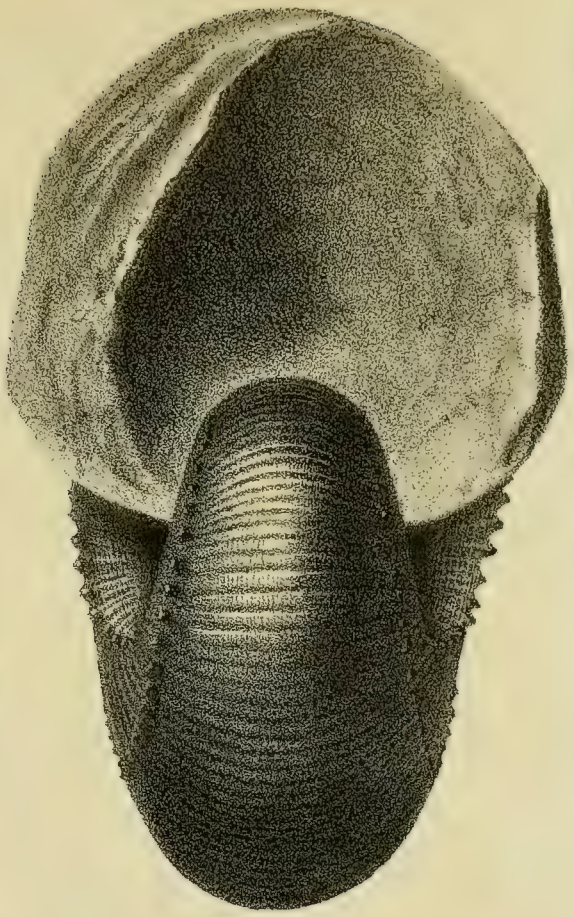


Fig 5

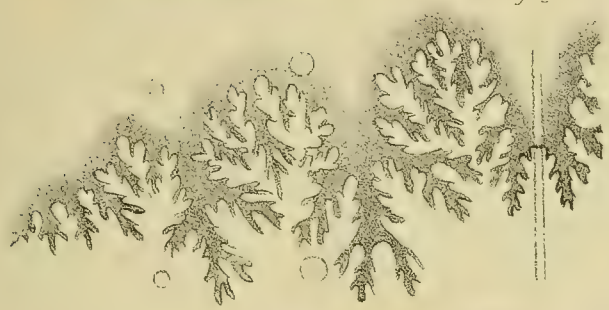


Fig 1

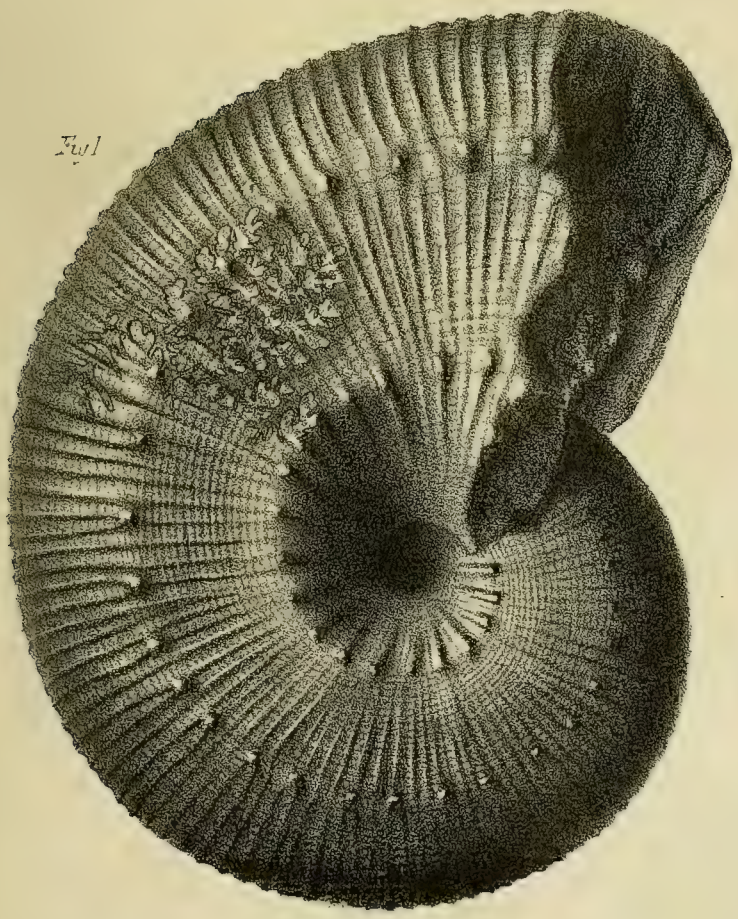


Fig. 4.

PLATE XLII.

Zone of Aegoceras Henleyi.

Fig. 1. AEGOCERAS STRIATUM, *Reinecke.* Side view, natural size. My collection.

2. — — — Side view of a smaller shell, showing sculpture.

3. — — — Front view of figure 1.

4. — — — Siphonal area of figure 2.

5. — — — Lobe-line, showing the extremely ramified lobes and saddles of this fossil.

Fig 2

Fig 3

Fig 5

Fig 1

Fig 4.

PLATE XLIII.

Zone of Aegoceras Henleyi.

A very fine old shell of AEGOCERAS STRIATUM, *Reinecke*. Collected upwards of thirty years ago near Lyme Regis. Was long in the possession of a local collector, but now belongs to the Museum of the Royal School of Mines, and kindly lent by Mr. Etheridge, F.R.S., for this plate. The figure is of the natural size.

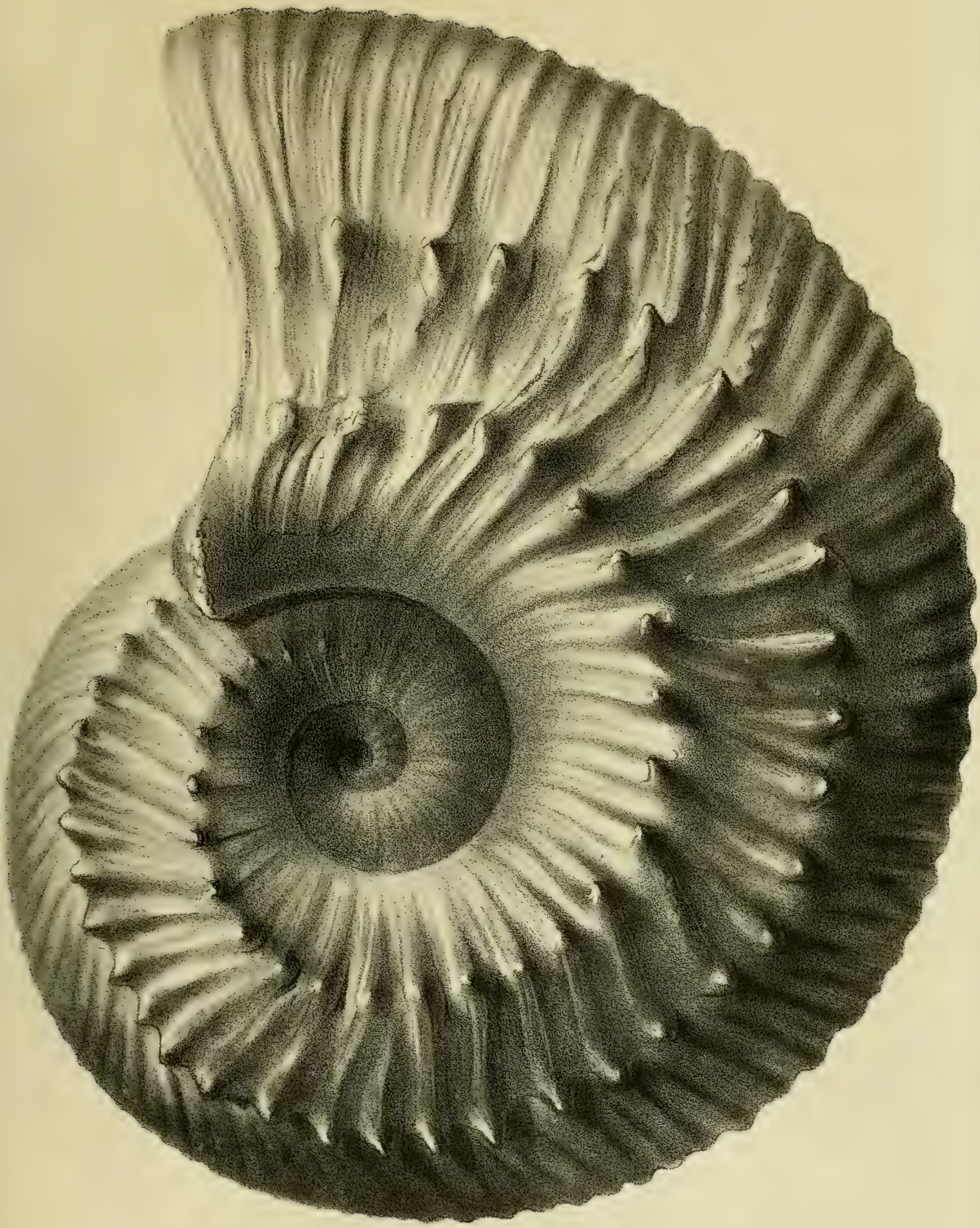


PLATE XLIV.

AMALTHEUS GREENOUGHI, *Sowerby*. One half the natural size. British Museum.

A Gawan del.et lith.

Hanhart lith imp

PLATE XLV.

Zone of Amaltheus oxynotus.

Fig. 1. AMALTHEUS GUIBALIANUS, *d'Orbigny*. Side view, young shell, natural size. My collection.

2. — — — Siphonal area of do. do.

3. — — — Front view of a larger fossil showing the shape of the aperture, nat. size.

4. — — — Side view of another example showing the lobes and saddles *in sitú*.

5. — — — Lobe-line showing the lobes and saddles enlarged, from a tracing on the fossil.

6. — — — Front view of a larger specimen showing siphonal area, keel, and terminal costæ.

7. — — — Side view of the same specimen showing the lateral foldings and umbilicus, natural size.

Fig.1.

Fig.2

Fig 3

Fig 4

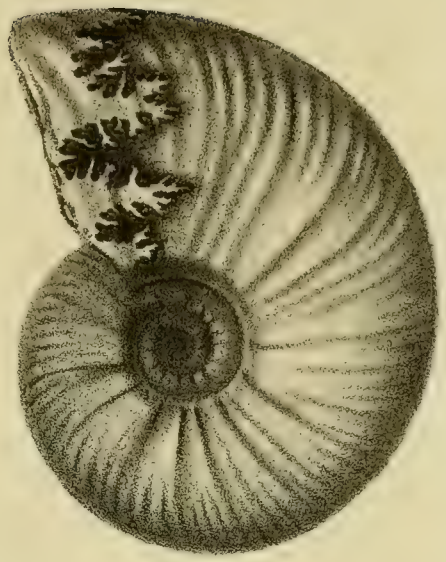


Fig 5

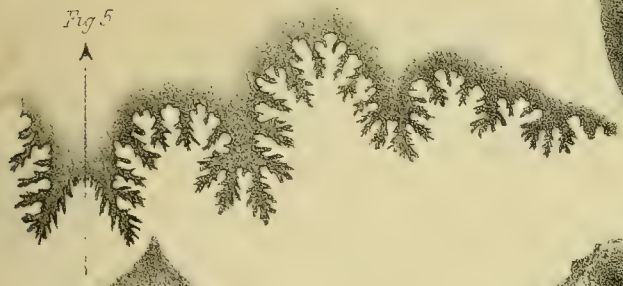


Fig.6.

Fig.7

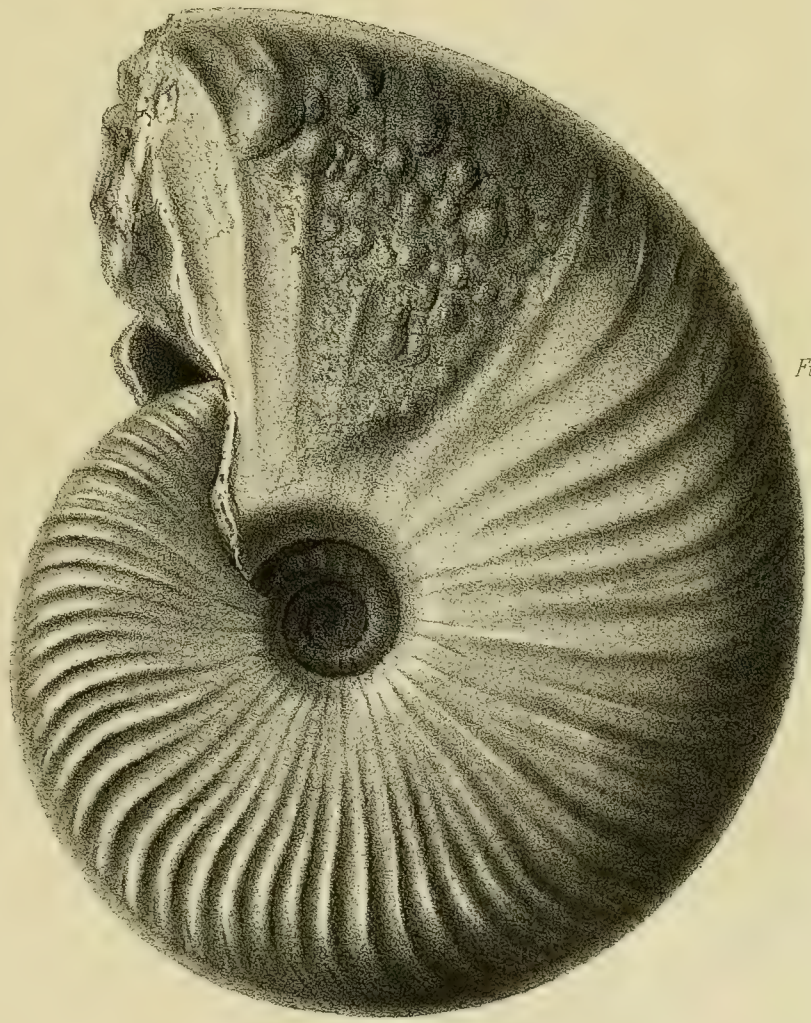


PLATE XLVI.

Zone of Amaltheus oxynotus.

Fig. 1. AMALTHEUS LYMENSIS, *Wright.* Side view, natural size. My collection.
2. — — — Front view of the same fossil.
3. — — — Lobe-line with lobes and saddles enlarged, from a tracing of the fossil.
4. — OXYNOTUS, *Quenstedt.* Side view, natural size. My collection.
5. — — — Front view, natural size, same shell.
6. — — — Lobe-line with lobes and saddles enlarged, from a tracing of the fossil.

Fig. 2

Fig. 3.

Fig. 1

Fig. 4.

Fig. 6

Fig. 5

PLATE XLVII.

Zone of Amaltheus oxynotus.

Fig. 1. AMALTHEUS LYMENSIS, *Wright.* Side view, natural size, of a fine specimen with the shell.

2. — — — Front view of do. do.

3. — — — Lobe-line complete, highly magnified.

4. — SIMPSONI, *Bean.* Side view, natural size. Woodwardian Museum, Cambridge.

5. — — — Lobe-line of do. do.

6. — — Side view of smaller specimen, natural size.

7. — — — Front view of do. do.

Fig. 1

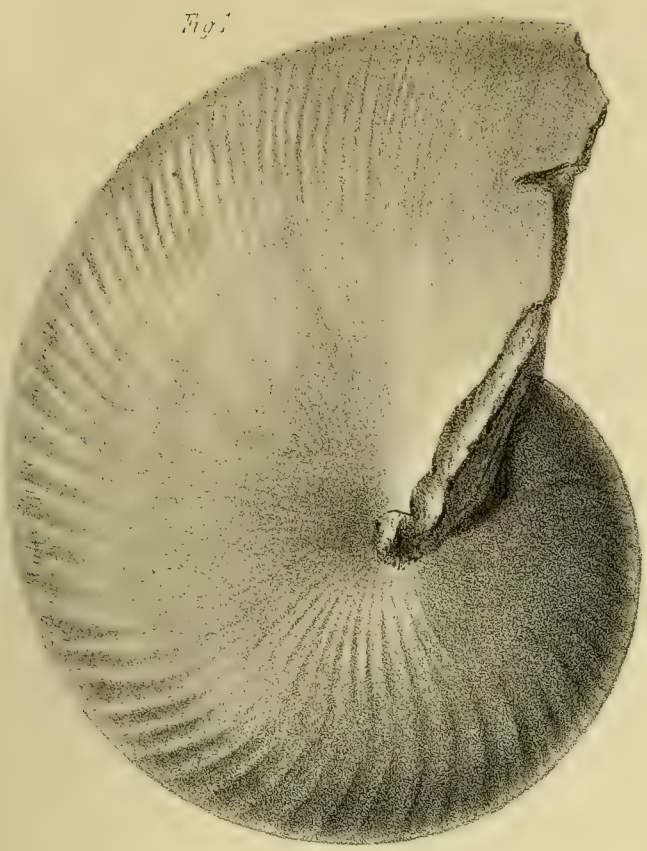


Fig. 3

Fig. 2

Fig. 5

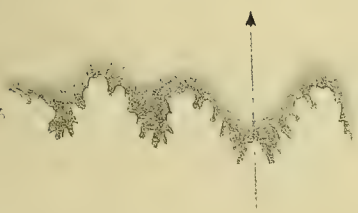


Fig. 4

Fig. 6.

Fig. 7

PLATE XLVIII.

Zone of Amaltheus oxynotus.

Fig. 1. AMALTHEUS LYMENSIS, *Wright.* Side view, natural size; a highly ribbed variety.

2. — — — Front view of do. do. My collection.

3. — WILTSHIREI, *Wright*, nov. sp. A side view, natural size. My collection.

4. AEGOCERAS PORTLOCKII, *Wright*, nov. sp. Siphonal area, natural size. Museum of Irish Survey, Dublin.

5. — — — Side view, natural size do. do.

Fig 2

Fig 1

Fig 4

Fig 3

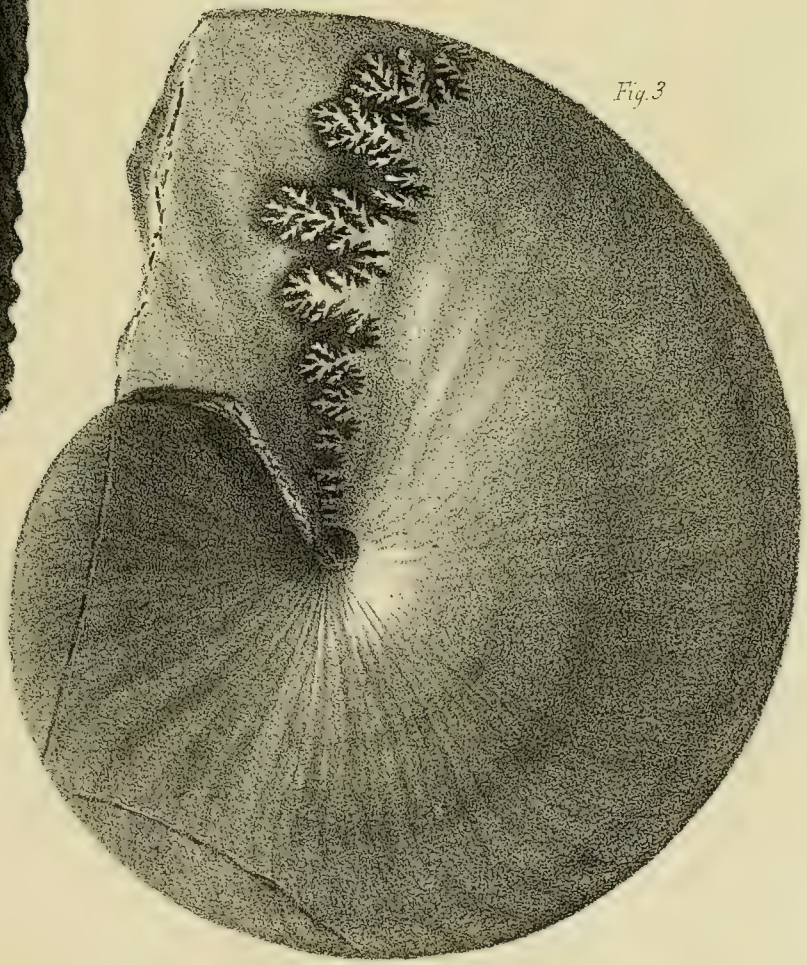
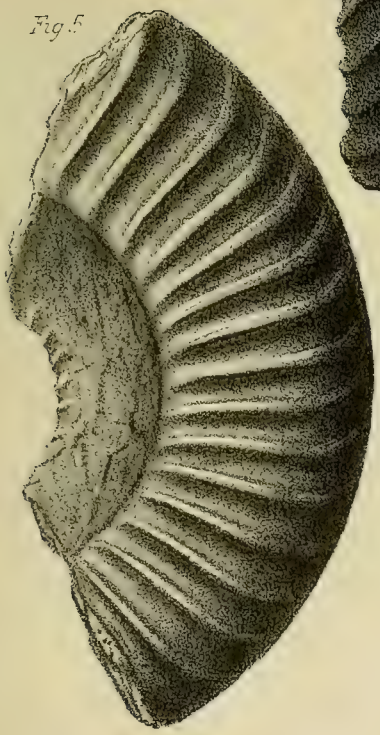


Fig 5



A.Gawan del.et lith.

Hanhart lith imp

PLATE XLIX.

Zone of Aegoceras angulatum.

Fig. 1. Aegoceras laqueolus, *Schloenbach.* Side view, natural size. Obtained by the late Mr. Lamley from the Lower Lias at Halford, between Stratford-on-Avon and Shipston-on-Stour, and presented by him to the Warwick Museum. Kindly communicated by Robert Tomes, Esq., F.G.S.

Zone of Amaltheus margaritatus.

4. Harpoceras nitescens, *Young* and *Bird.* Side view, magnified two diameters. Marlstone. My collection.

5. — — — View of siphonal area, showing the siphuncle below the keel of the shell. My collection.

3. — — — Lobe-line of the same shell, magnified.

6. — — — Another specimen, natural size.

7. — — — Siphonal area. My collection.

2. — — — Lobe-line of the same, magnified.

Fig 1

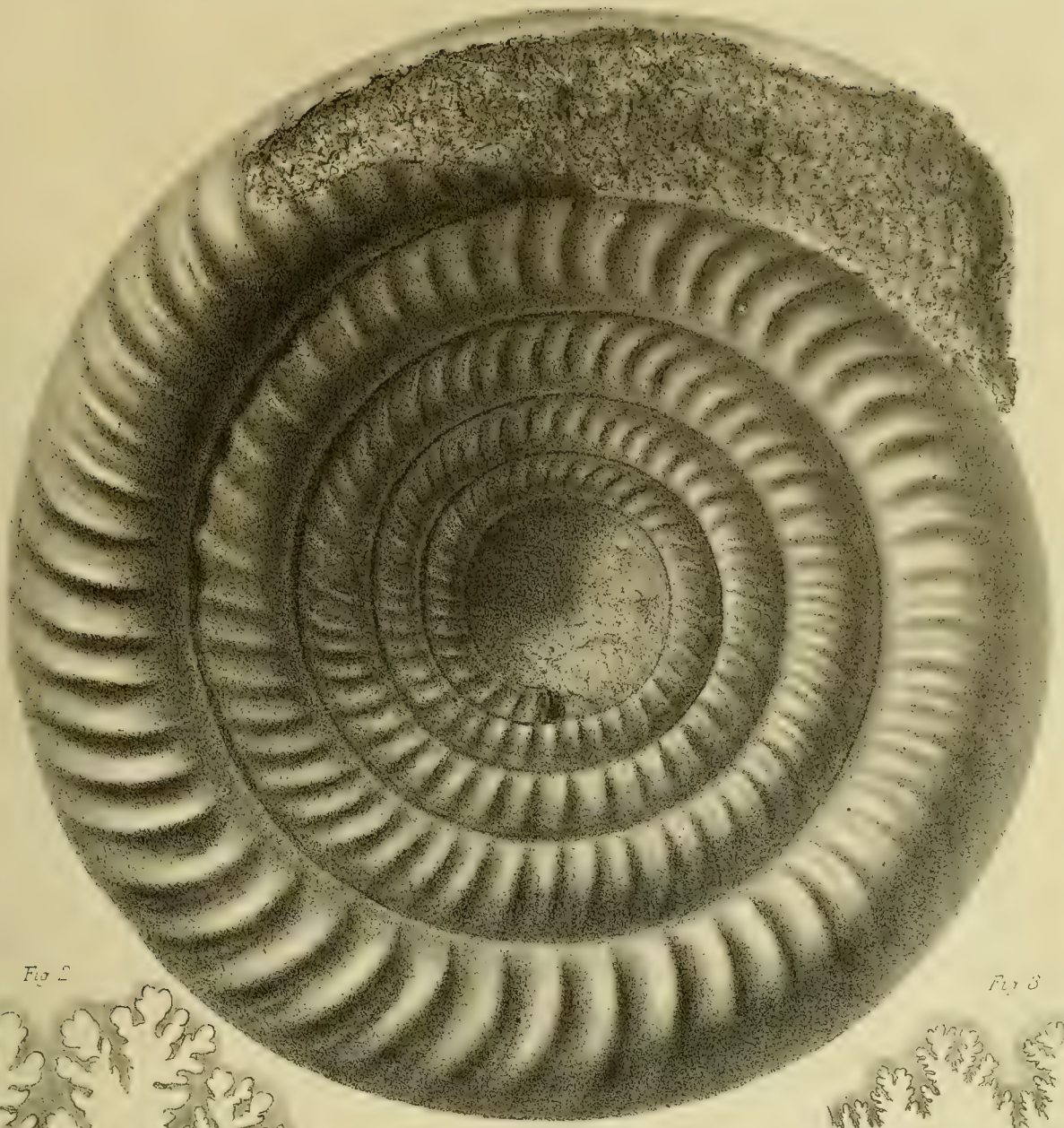


Fig 2

Fig 3

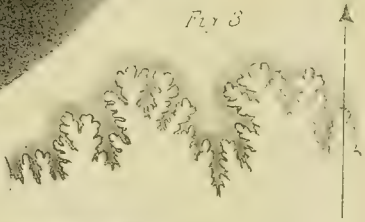


Fig 4

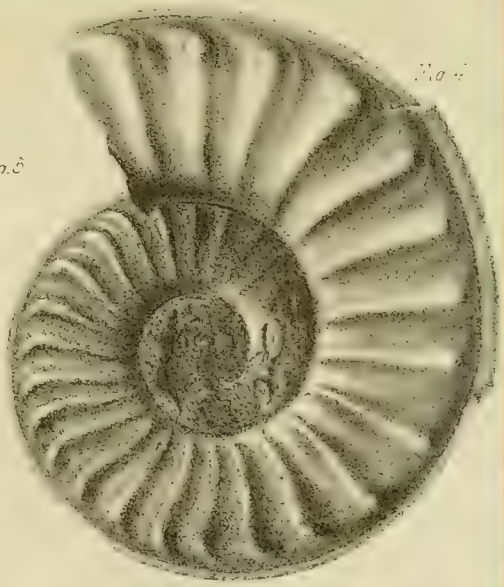


Fig 5

Fig 6

Fig 7

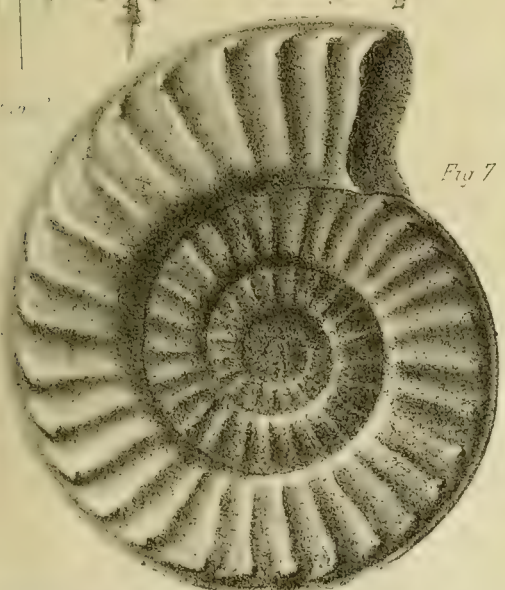


PLATE L.

Zone of Amaltheus oxynotus ?

Fig. 1. AEGOCERAS SLATTERI, *Wright.* Side view, natural size. T. J. Slatter, Esq., F.G.S.

2. — — — Siphonal area, do. } All the specimens of this species are in his collection.

3. — — — Front view. }

4. — — — Siphonal area. }

5. — — — Do. }

6. — — — Young shell showing a keel, natural size.

7. — — — Do. do. siphonal area with keel.

8. — — — Lobe-line, magnified.

Zone of Aegoceras Jamesoni.

9. — CARUSENSE, *d'Orbigny.* Side view, natural size. My collection.

10. — — — Siphonal area.

11. — DENSINODUM, *Quenstedt.* Side view, natural size. do.

12. — — — Siphonal area, do.

13. — BREVISPINA, *Sowerby.* Side view, do. Collection of the Rev. J. E. Cross, F.G.S.

14. — — — Siphonal area, natural size.

Fig. 2.

Fig 1.

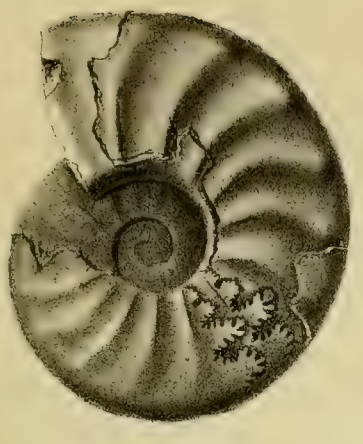


Fig 3

Fig 4.

Fig 5.

Fig 9

Fig 10.

Fig 8

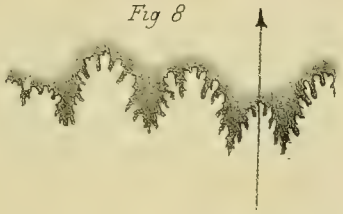


Fig. 7

Fig 6.

Fig 13

Fig. 11

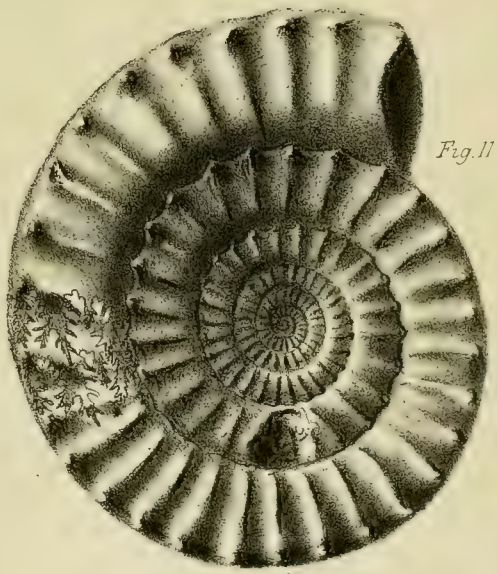


Fig 14

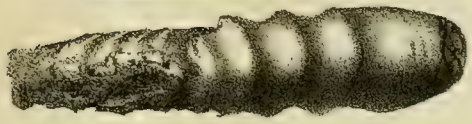


Fig IX

PLATE LI.

Zone of Aegoceras Jamesoni.

Fig. 1. AEGOCERAS JAMESONI, *Sowerby*. Side view, natural size, large ribbed variety.

2. — — — Siphonal area, do. Collected at Mungar, and belongs to the Bristol Museum.

3. — — — Side view, natural size. Hechingen. My collection.

4. — — — Do. do. Pabba. do.

5. — — — Young shell, do. Leckhampton. do.

6. — — — Siphonal area, same shell.

Fig. 1.

Fig. 2.

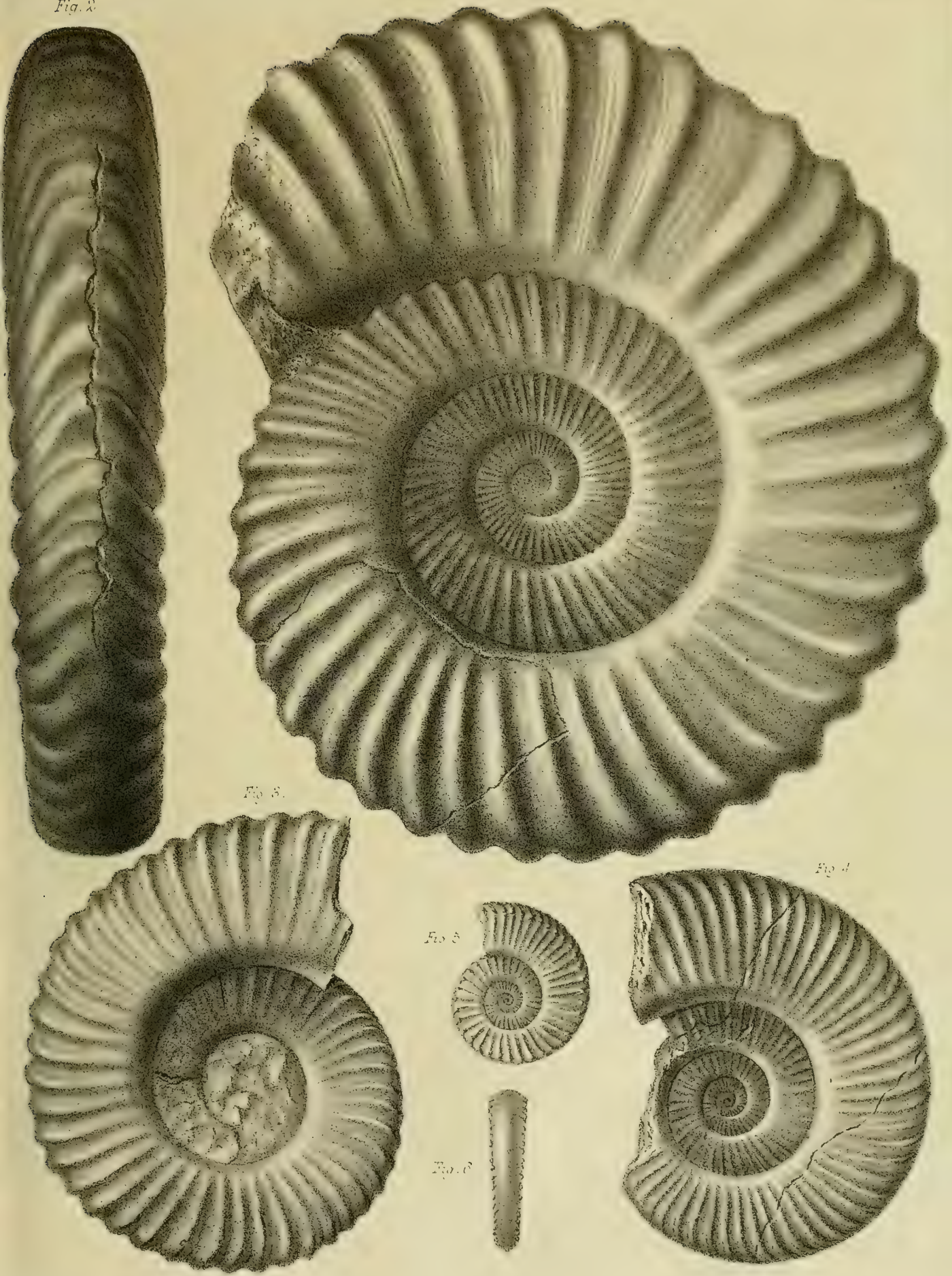


Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

A.Gawan del.et lith.

Hanhart imp.

PLATE LII.

Zone of Aegoceras Jamesoni.

Fig. 1. AEGOCERAS SAGITTARIUM, *Blake*. Side view, two thirds natural size.
2. — — — Siphonal area of the shell, two thirds natural size. Collection of the Rev. J. E. Cross, F.G.S.
3. — — — Lobe-line, magnified.
4. — — — Side view of small shell, natural size.
5. — — — Siphonal area of do. do.

Fig 1.

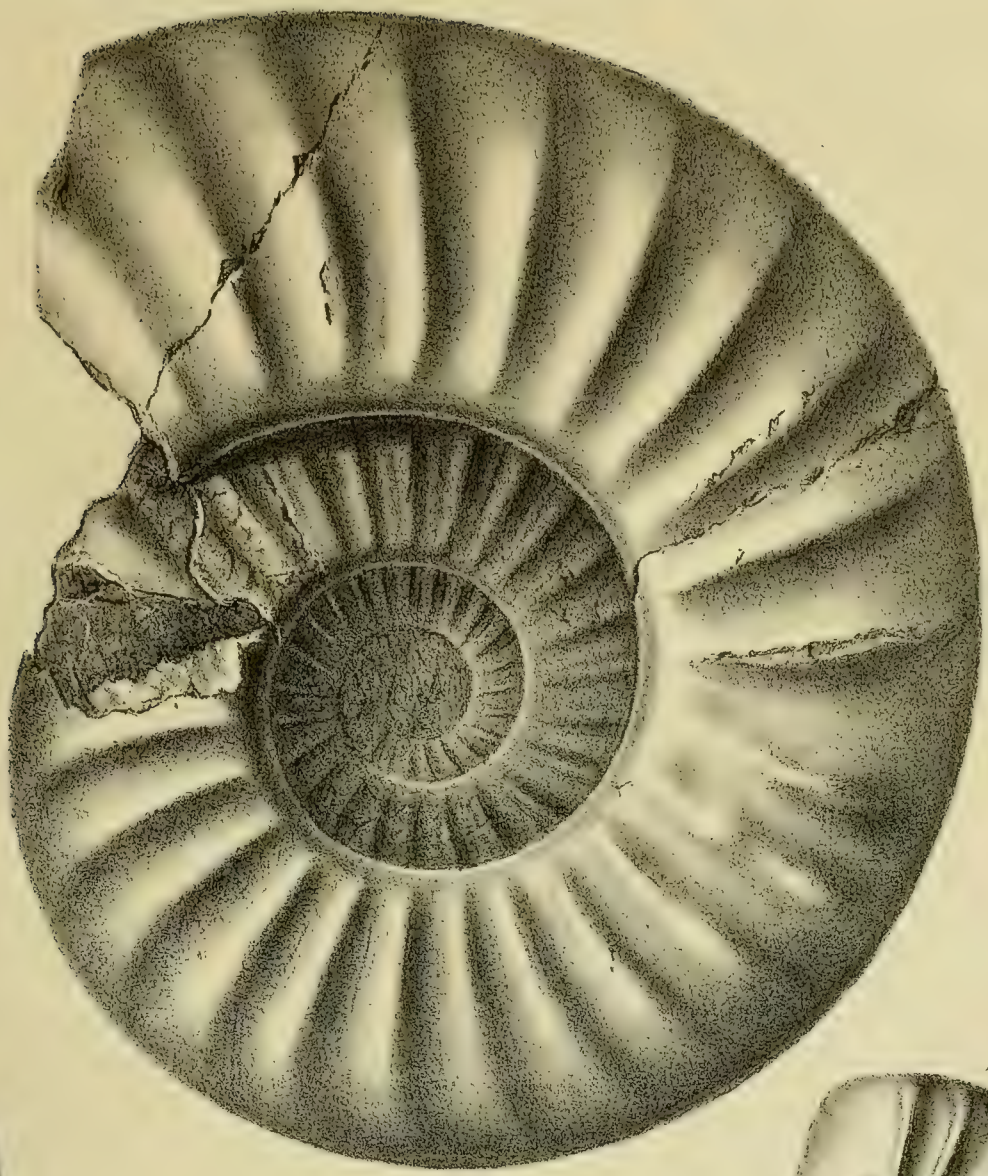


Fig 5

Fig 4

Fig 3.

Fig 2

A Cawan del. et lith.

Hanhart imp

PLATE LII A.

Zone of Aegoceras Jamesoni.

Fig. 1. AEGOCERAS SAGITTARIUM, *Blake.* Side view, variety *a*, natural size. My collection.

2. — — — Siphonal area, do. do.

3. — — — Side view, natural size. do.

4. — — — Front view, do.

5. — — — Side view, do. do.

6. — — — Siphonal area, do.

Fig. 2.

Fig. 1.

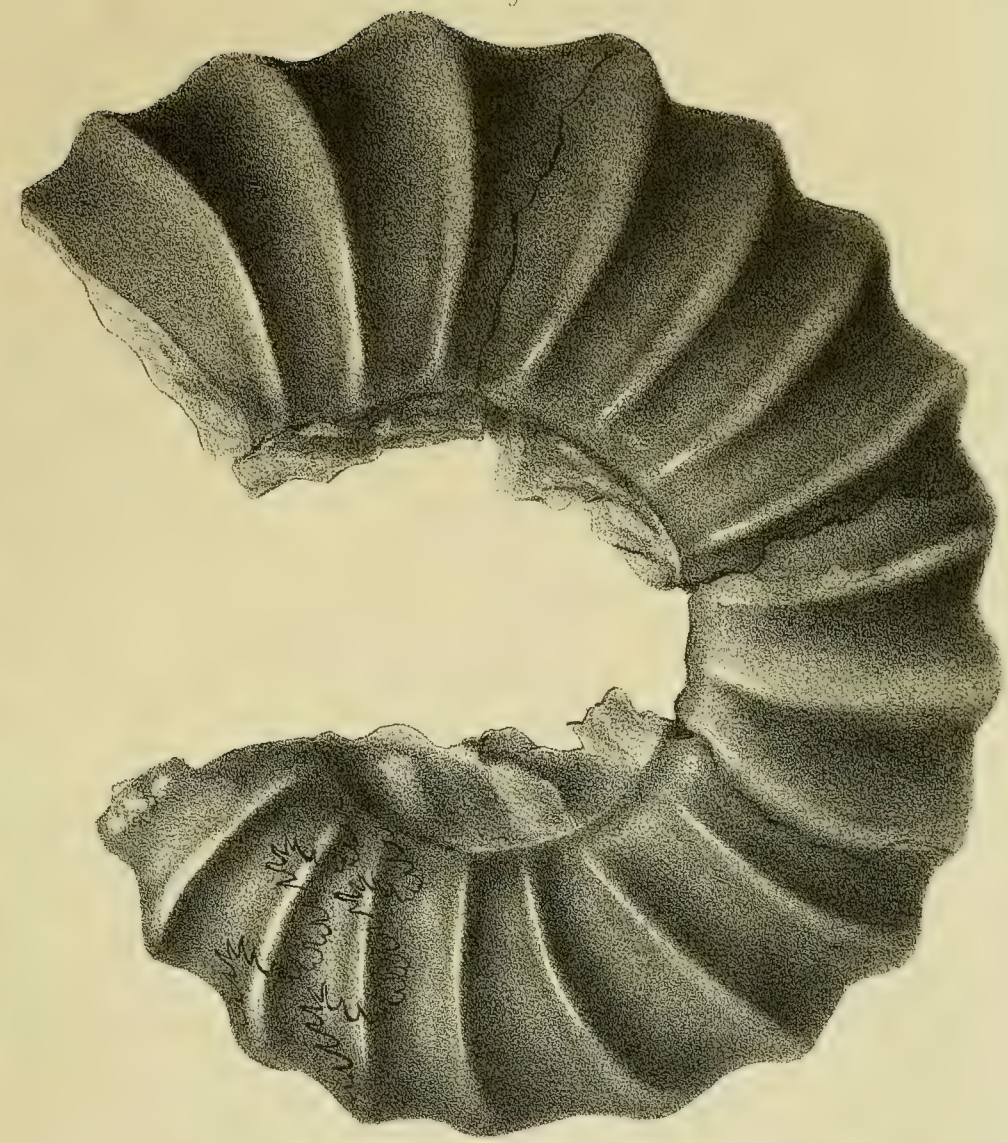


Fig. 5.

Fig. 6.

Fig. 4.

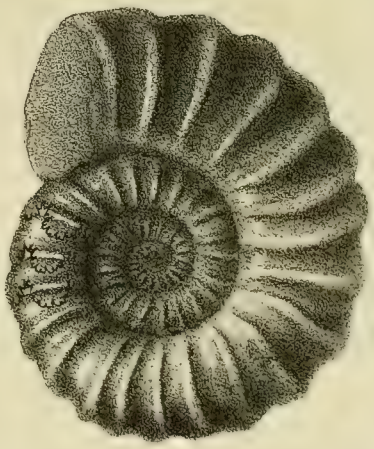


Fig. 3

Mary Suft del. et lith.

Hanhart imp

PLATE LIII.

Zone of Amaltheus margaritatus.

Fig. 1. Amaltheus margaritatus, *Montfort.* Side view, natural size. My collection.

Fig. 1.

A. Lawan del et lith

PLATE LIV.

Fig. 1. AMALTHEUS MARGARITATUS, *Montfort*. Front view, natural size. My collection.
2. — — — Back view, do.
3. — — — Do. showing the imbrication of the keel. do. do.

Fig 1

Fig. 2

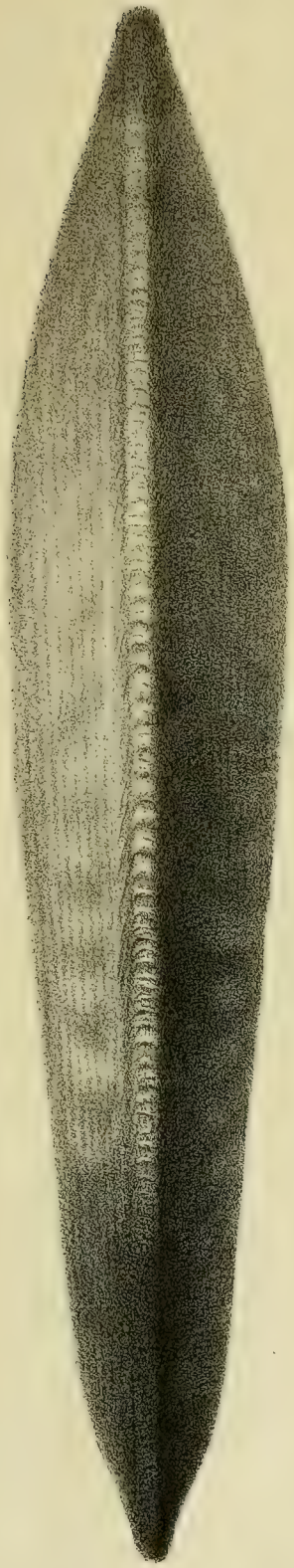
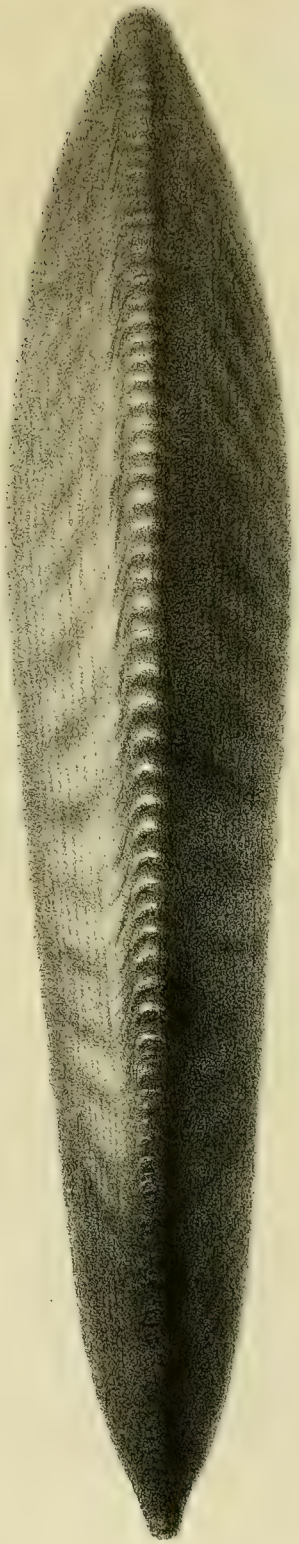


Fig. 3



A.Gawan del.et lith

Hanhart imp

PLATE LV.

Zone of Amaltheus spinatus.

Fig. 1. AMALTHEUS SPINATUS, *Bruguiere.* Side view, natural size. My collection.
2. — — — Front view, showing the keel and spines. My collection.

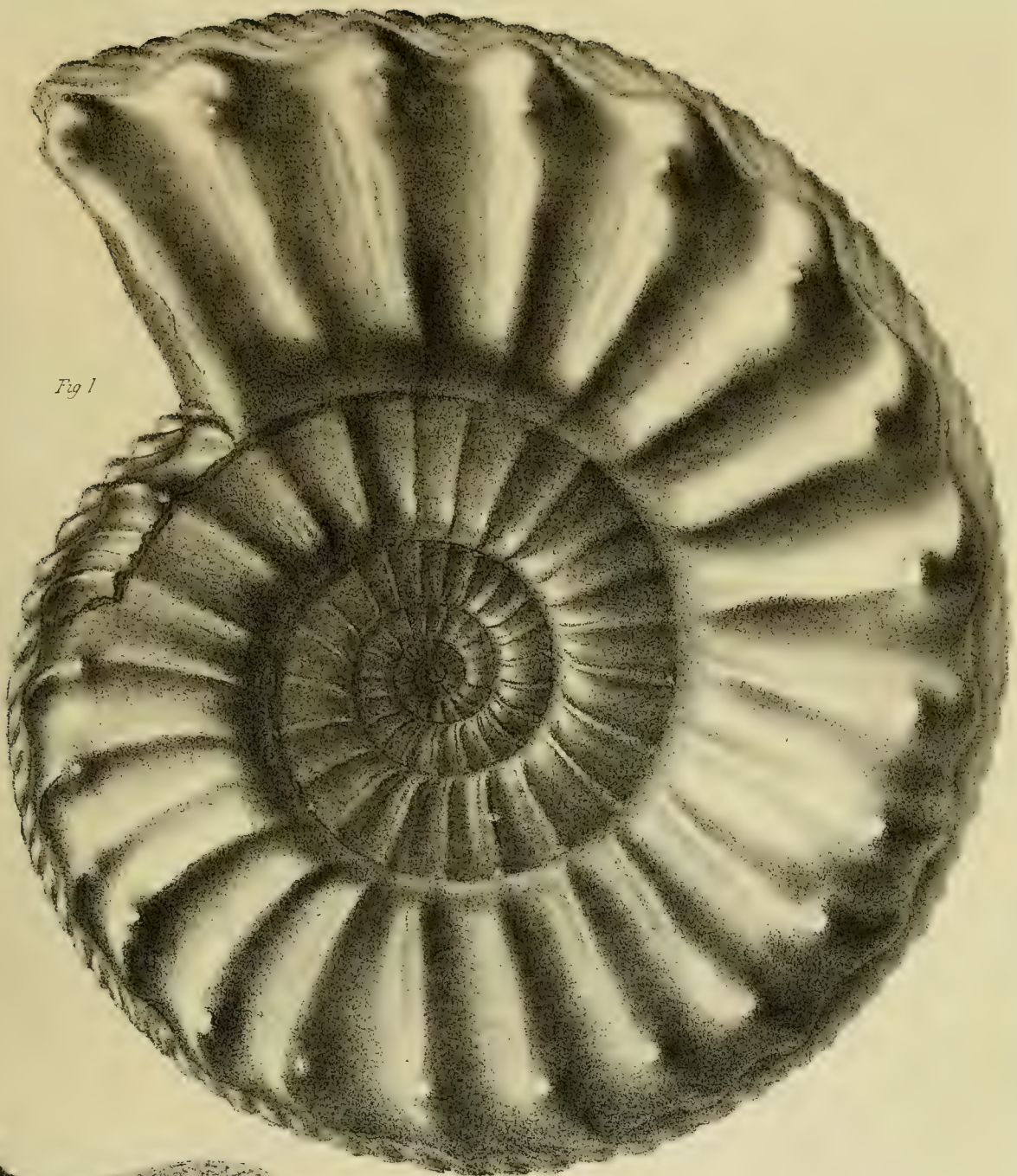


Fig 1

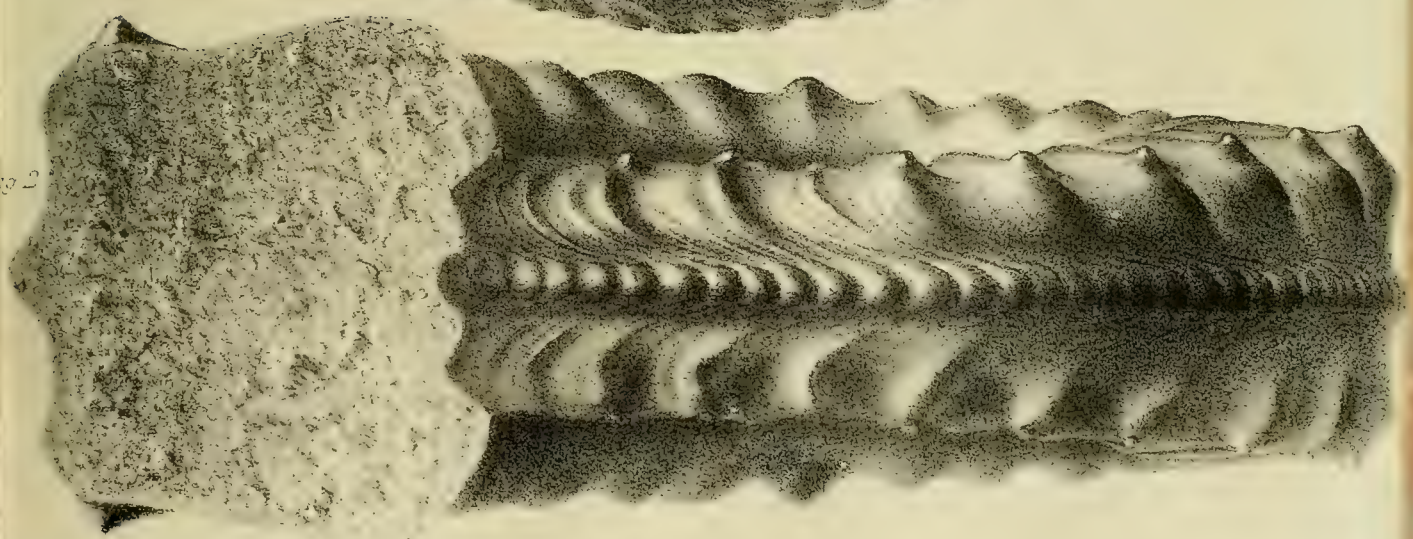


Fig 2

A.Gawan del et lith

PLATE LVI.

Zone of Amaltheus spinatus.

Fig. 1. AMALTHEUS SPINATUS. Back view for keel and spines, natural size. My collection.
2. — — Side view, showing spines.
3. — — Front view, mouth aperture, and spines, and keel.
4. — — Lobe-line, magnified. My collection.
5. — — Front, showing aperture and position of siphuncle. do.

Zone of Amaltheus margaritatus.

6—14, 19, 20. AMALTHEUS MARGARITATUS. Shells of different ages showing the evolution of this species. My collection.
15. — — Type form of a young shell. do.

Zone of Amaltheus oxynotus.

16. AEGOCERAS LACUNATUM, *Buckman*. Side view, natural size. My collection.
17. — — — Siphonal area, showing furrow, natural size.
18. — — — Front view, do. do.

Fig 1

Fig 2

Fig 3

Fig 4

Fig.5.

Fig.7

Fig 6.

Fig 9.

Fig 8

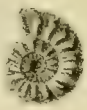


Fig.12

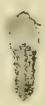


Fig.11.

Fig 10.

Fig.14.

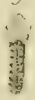


Fig.13

Fig 19

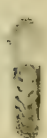


Fig.20.

Fig.15.

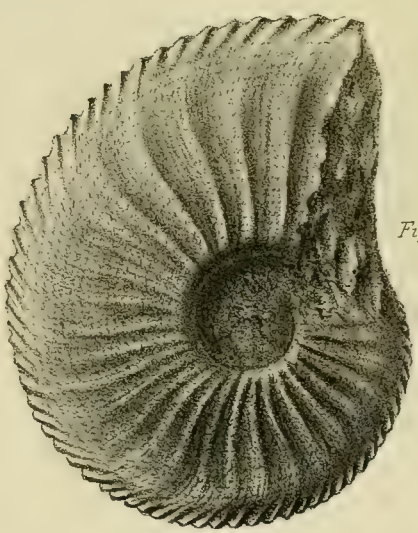


Fig.17

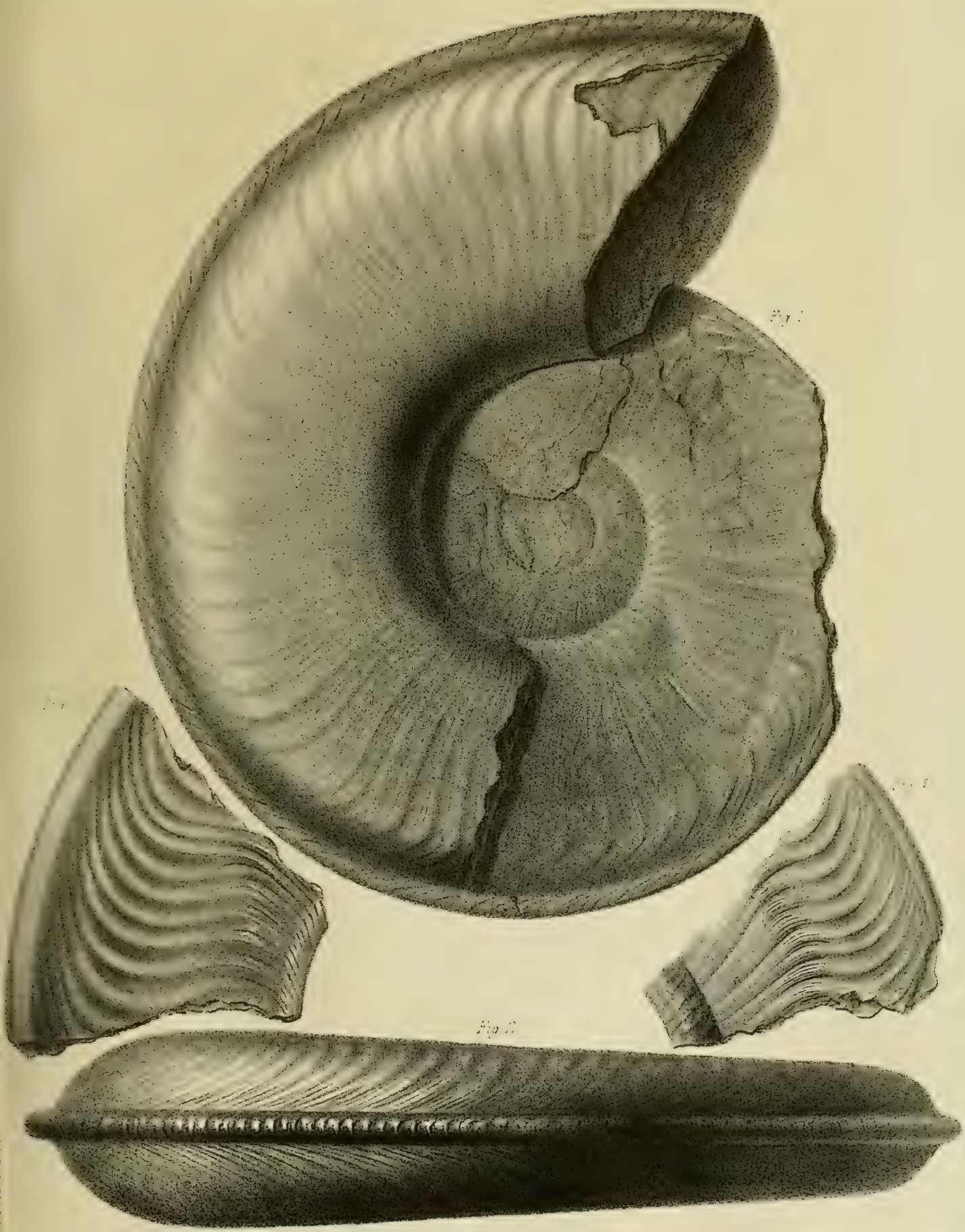
Fig.16.

Fig.18.

PLATE LVII.

Zone of Aegoceras Jamesoni.

Fig. 1. HARPOCERAS ANTIQUUM, *Wright.* Side view, natural size. My collection.
2. — — — Siphonal area, do.
3. — — — Flexure of ribbing and keel.
4. — — — Do. do.



A.Gawan del et lith.

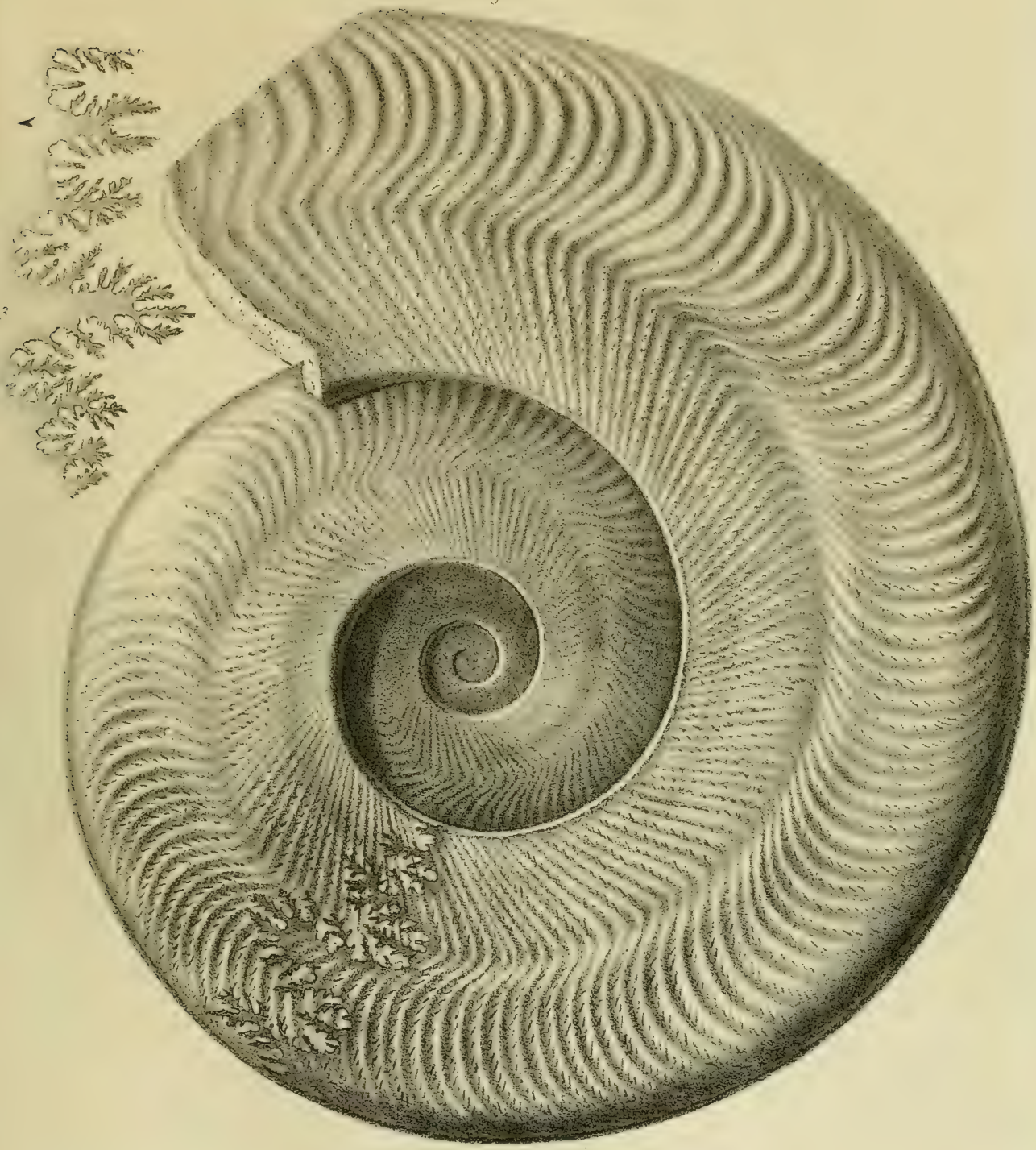
Hanhart imp

PLATE LVIII.

Zone of Harpoceras serpentinum.

Fig. 1. HARPOCERAS SERPENTINUM, *Schlotheim.* Side view, natural size. My collection.
2. — — — Siphonal area and keel, natural size.
3. — — — Lobe-line, magnified.

Fig 1



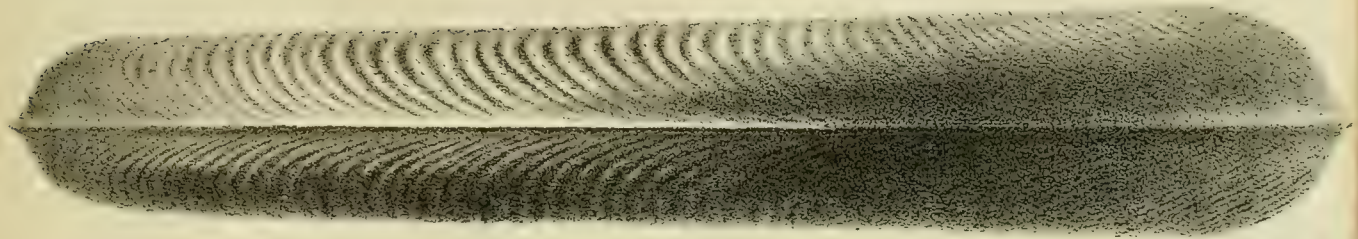


Fig 2

A.Gawan del.et lith

Hanhart imp.

PLATE LIX.

Zone of Harpoceras bifrons.

Fig. 1. HARPOCERAS BIFRONS, *Bruguiere.* Side view, lobe-line aperture and lateral processes, natural size. My collection.

2. — — — Siphonal area with lobe-line do. do.

3. — — — Fragment of a small shell with groove.

4. — — — Do. do. do.

Fig 1.

Fig 2.

Fig 3

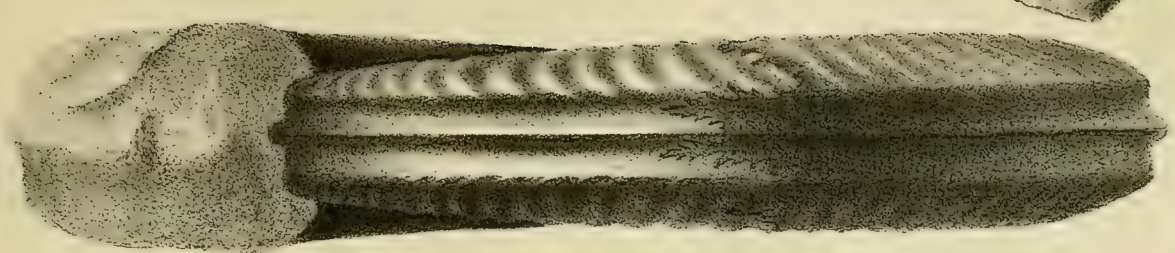


Fig 4.

A.Gawan del.et lith. Hanhart imp

PLATE LX.

Zone of Harpoceras bifrons.

Fig. 1. HARPOCERAS LEVISONI, *Simpson*. Side view, natural size, showing side aperture, lobes, process, and lobe-line. My collection.

2. — — — Siphonal area and keel, natural size.

Fig 1

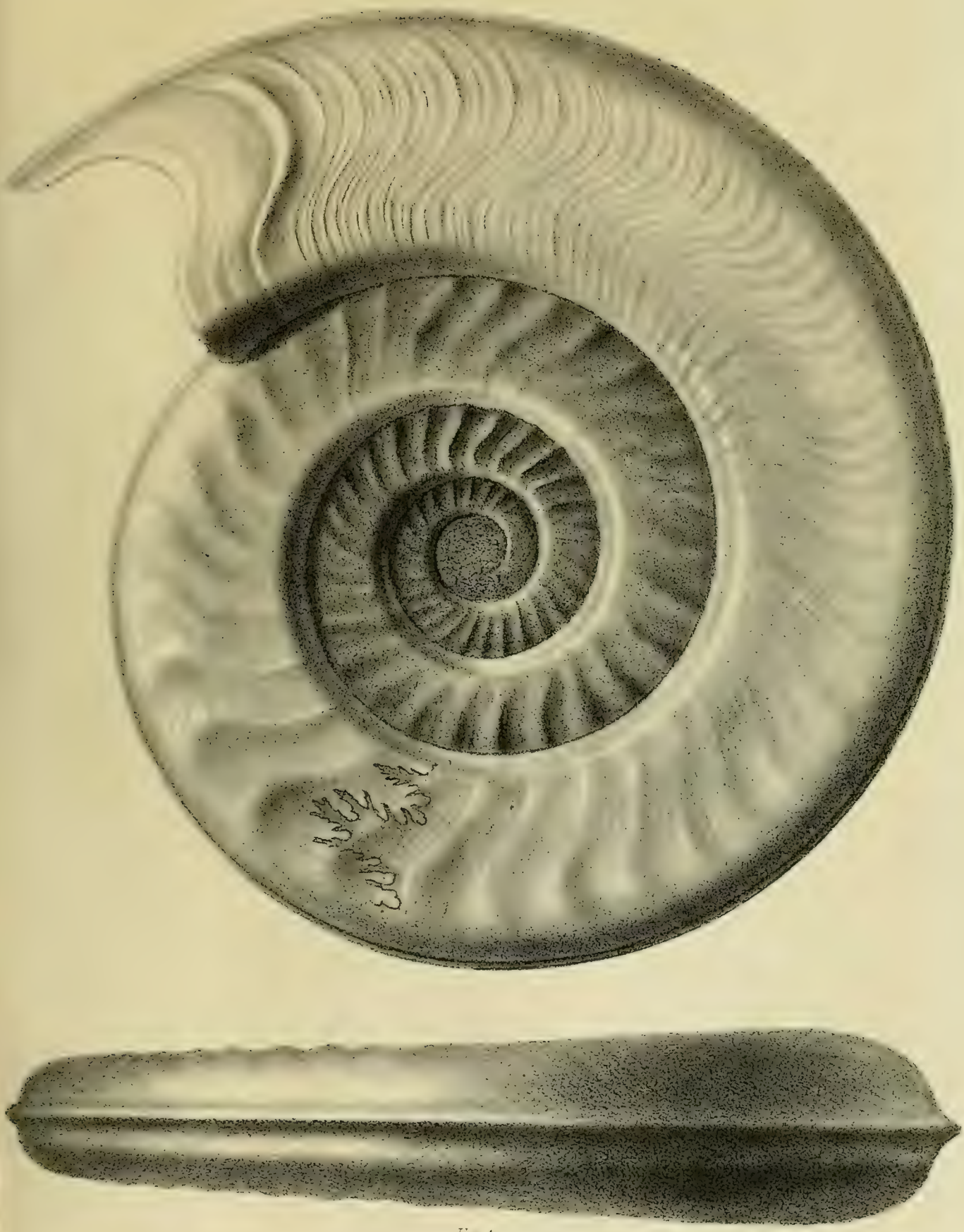


Fig 2

A.Gawan del.et lith

Hanhart

PLATE LXI.

Zone of Harpoceras bifrons.

Fig. 1. Harpoceras Levisoni, *Simp.* Young condition with keel, bisulcations, and prominent ribs, natural size. Bath Museum.

2. — — — Side showing the lateral costæ, natural size.

3. — — — Lobe-line of a young costated shell.

4. — — — Another fragment with Aptychus. Bath Museum.

5. — — — Another specimen, side view of ribbing.

6. — — — Siphonal area and keel.

Fig 1

Fig 3.

Fig. 2

Fig. 4

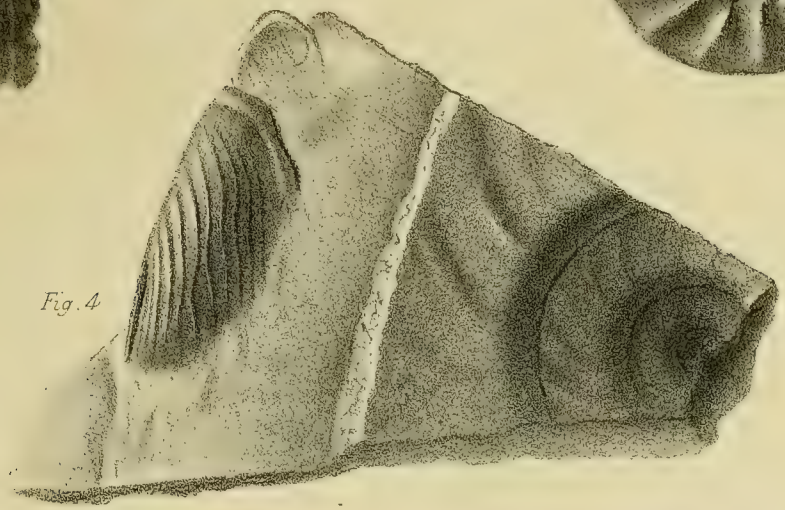


Fig. 5

Fig. 6

A.Gawan del.et lith

Hanhart imp

PLATE LXII.

Zone of Harpoceras serpentinum.

Fig. 1. HARPOCERAS EXARATUM, *Young* and *Bird.* Side view, natural size. My collection.

2. — — — Front view of do. do.

3. — — — Back view of do. do.

4. — LYTHENSE, — Side view, do. My collection.

5. — — — Back view of same, do.

6. — — — Front view do. do.

Fig 2

Fig 1

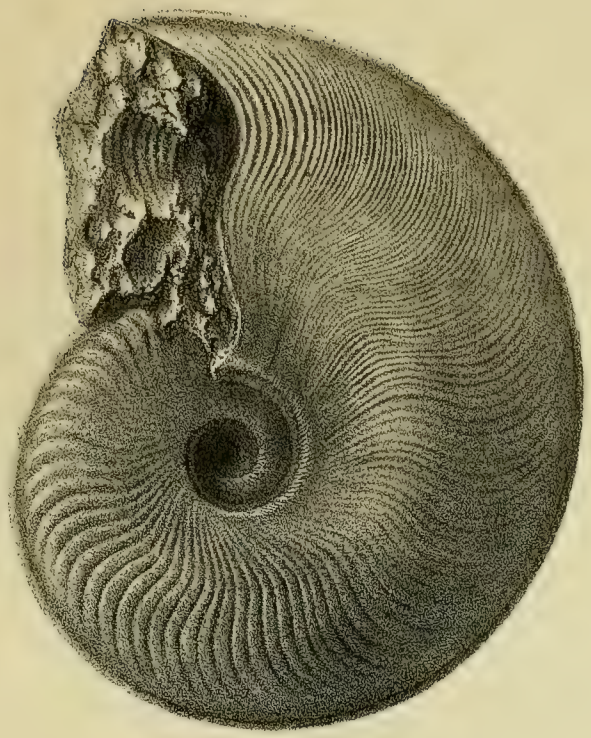


Fig 3

Fig 5

Fig 4

Fig 6

A.Gawan del.et lith

Hanhart imp

PLATE LXIII.

Zone of Harpoceras serpentinum.

Fig. 1. HARPOCERAS ELEGANS, *Sowerby.* Side view, natural size. My collection.

2. — — — Front view of same, do. do.

3. — — — Back view do. do. do.

4. — OVATUM, *Young* and *Bird.* Side view do. do. do.

5. — — — Front view of same, do. do.

6. — — — Back view do. do.

7. — — — Lobe-line, magnified.

Fig. 2

Fig. 1

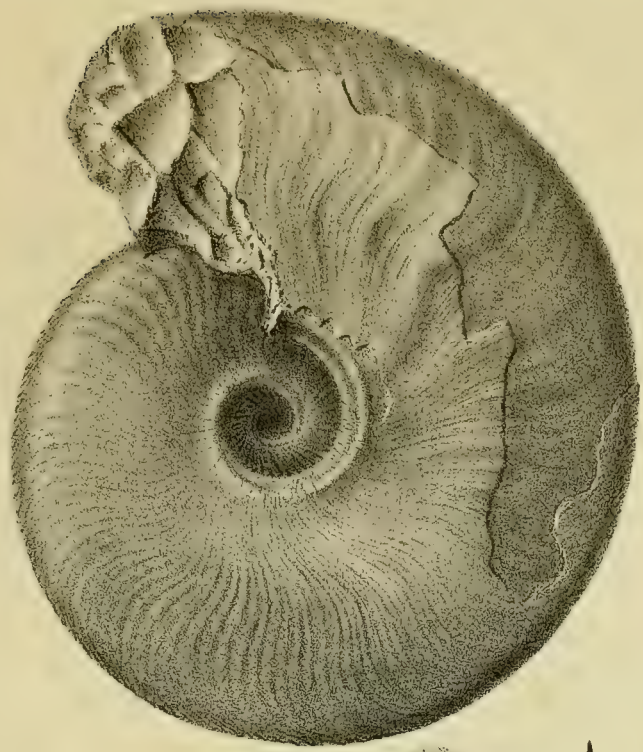


Fig. 7

Fig. 5.

Fig. 4

Fig. 6

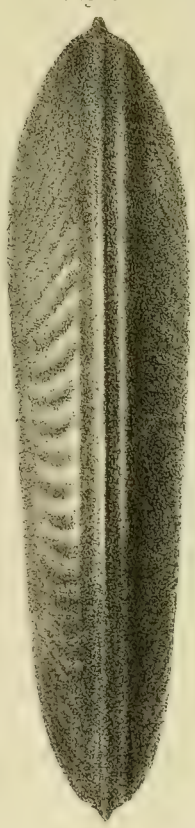


PLATE LXIV.

Zone of Lytoceras Jurense.

FIG. 1. HARPOCERAS RADIANS, *Schlotheim.* Side view, natural size. My collection.

2. — — — Front view, do.

3. — — — Back view, do.

4. — — — Lobe-line, magnified.

5. — — — Another specimen, side view, do.

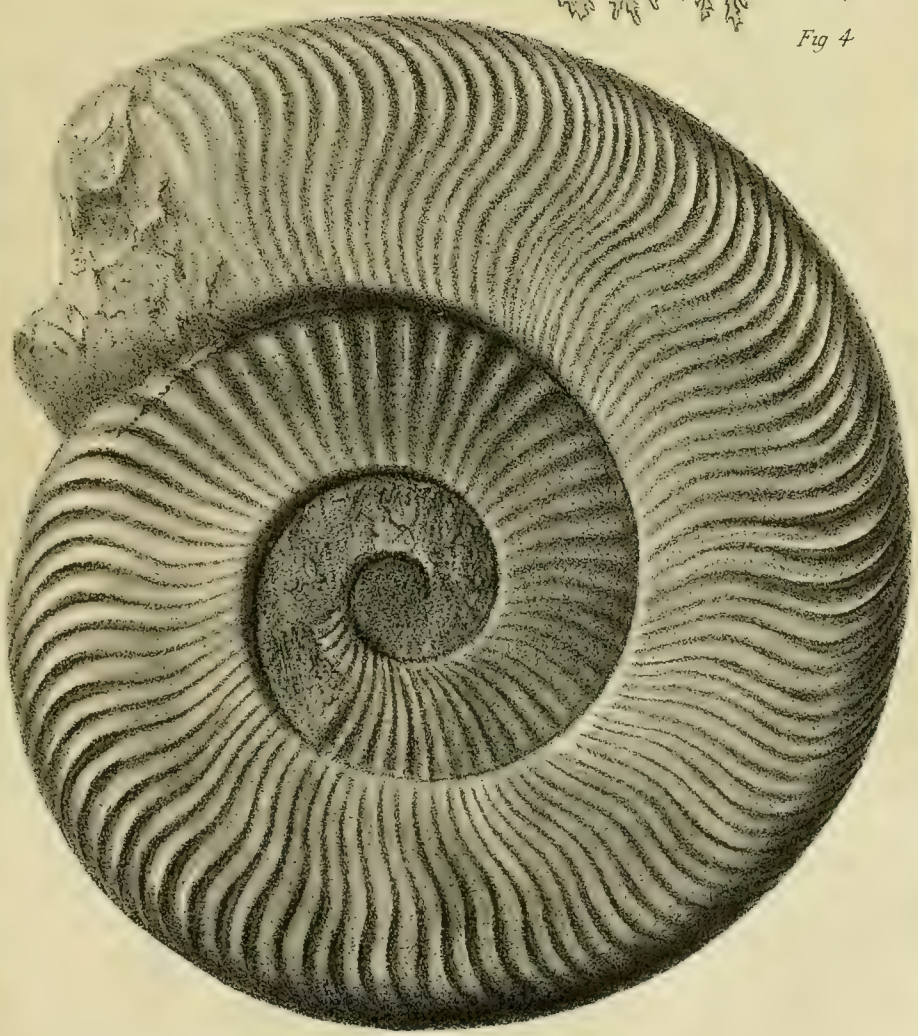
6. — — — Front view, do. do.

7. — — — Back view, do. do.

Fig 1

Fig 3

Fig 4



Fig

A.Gawan del.et lith.

Fig.5

Hanhart imp

PLATE LXV.

Zone of Lytoceras Jurense.

Fig. 1. HARPOCERAS INSIGNE, *Schubler.* Side view, natural size. My collection.
2. — — — Front view, showing ribs and keel, natural size.
3. — — — Back view, do. do.
4. — — — Variety with spinous sides, do.
5. — — — Do., front view, do.
6. — — — Lobe-line, magnified, do.

Fig 1

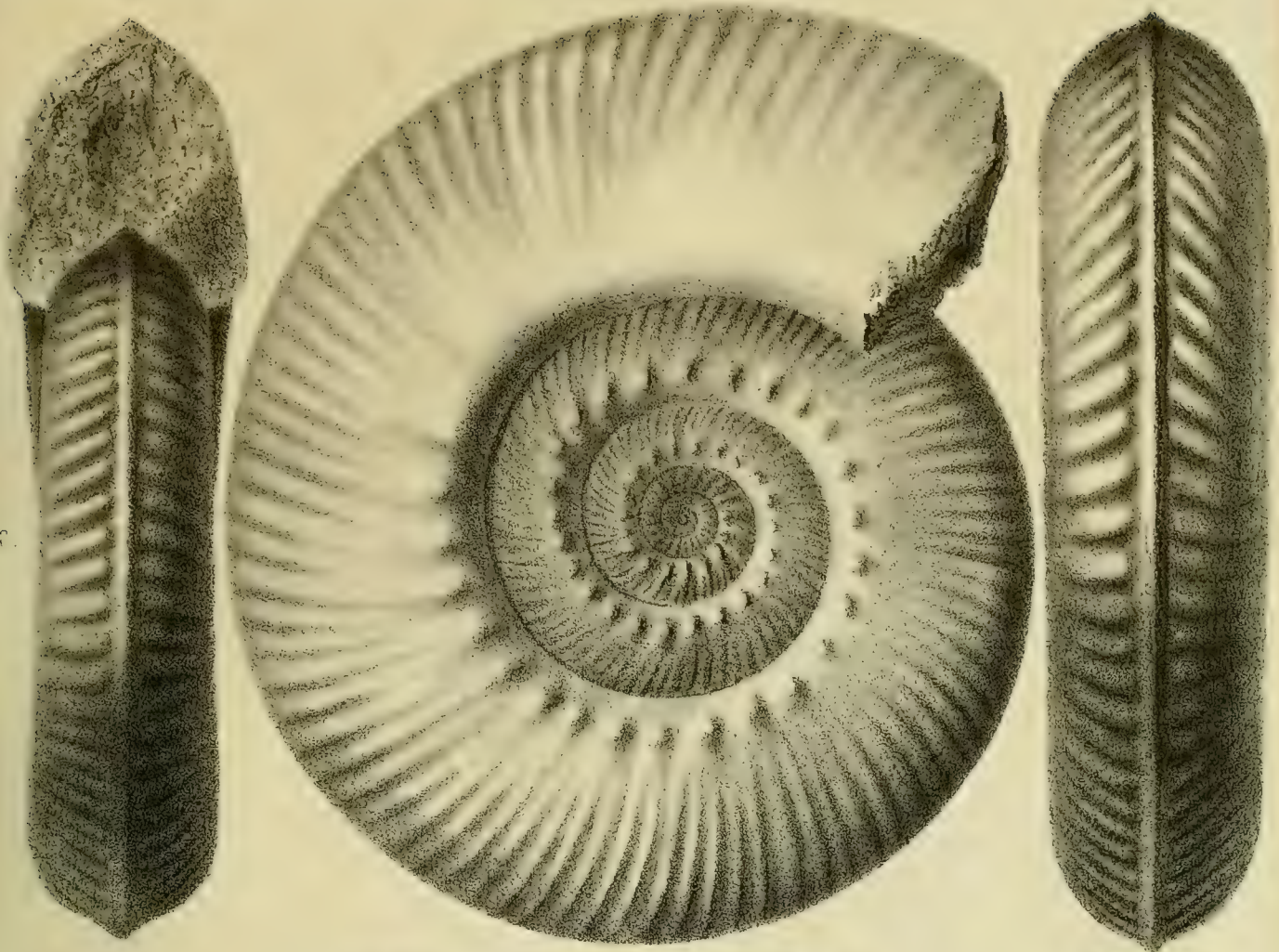


Fig 2.

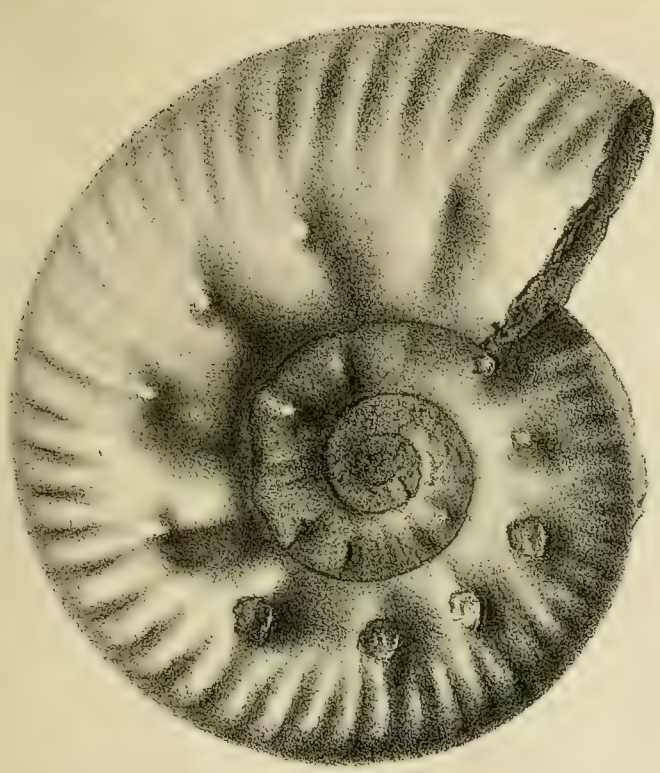


Fig 4

Fig. 6

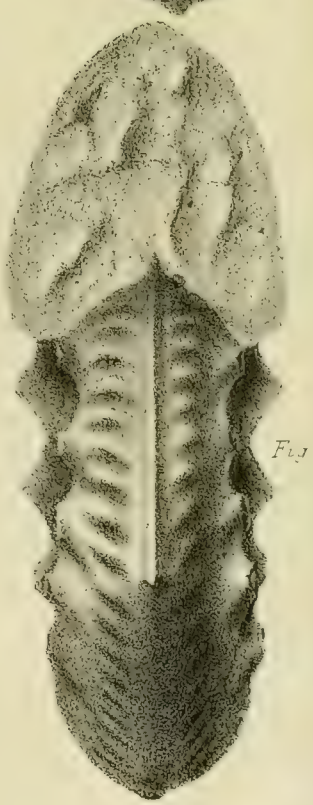


Fig 5

PLATE LXVI.

Zone of Lytoceras Jurense.

Fig. 1. HARPOCERAS INSIGNE, *Schubler.* Side view, reduced half natural size.
2. — — — Front view of this variety, do.
3. — — — Back view, do. do.

This shell is contained in the Geneva Museum, and was collected in the Terrain Toarcien of Thouars, Deux-Sévres, France.

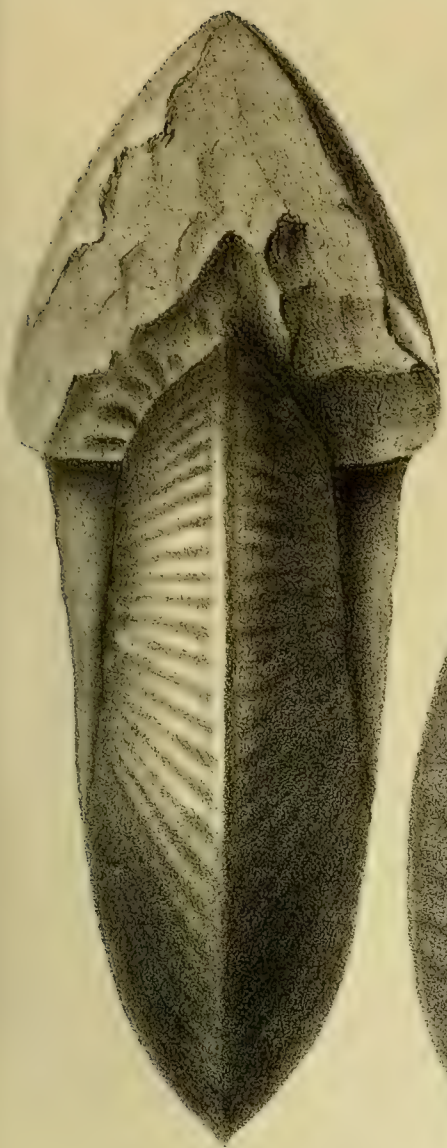
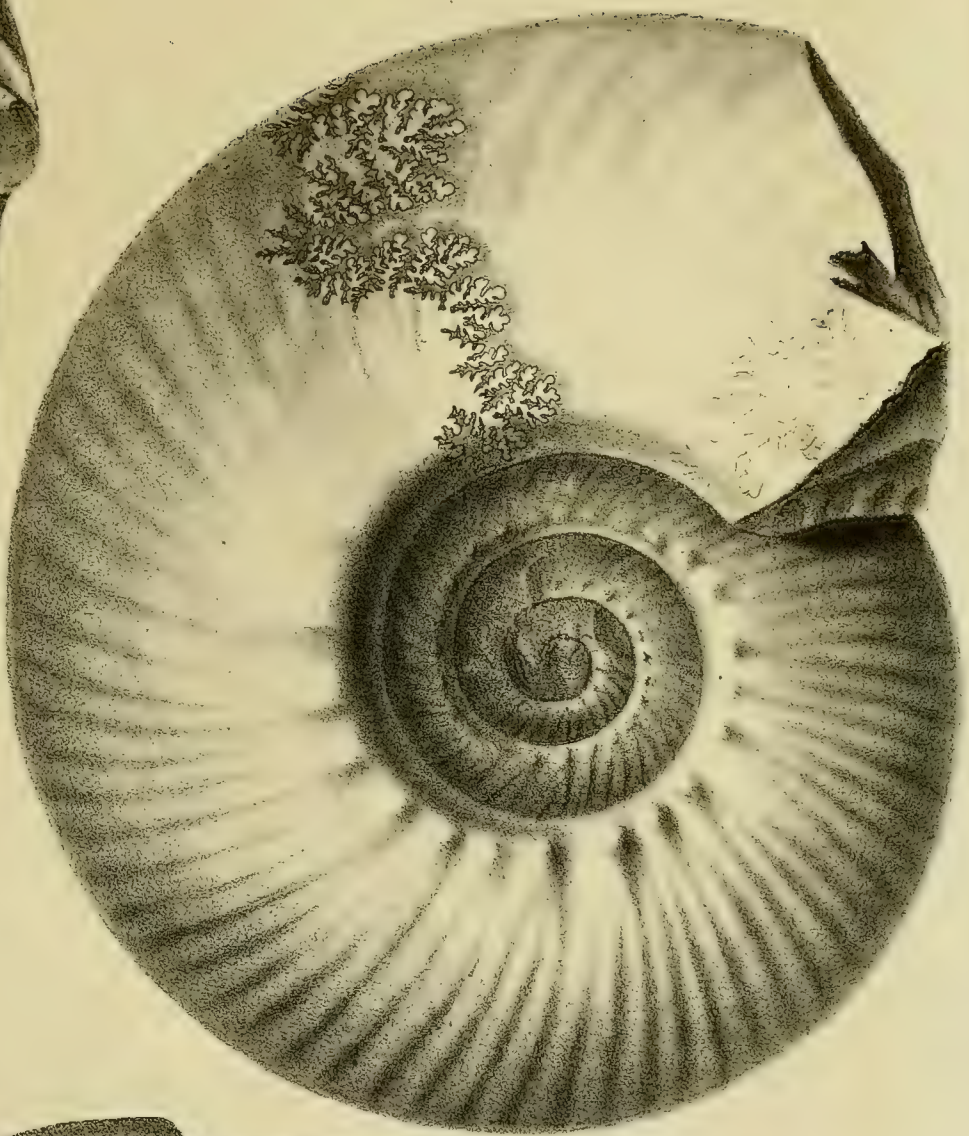


Fig. 2

Fig. 1



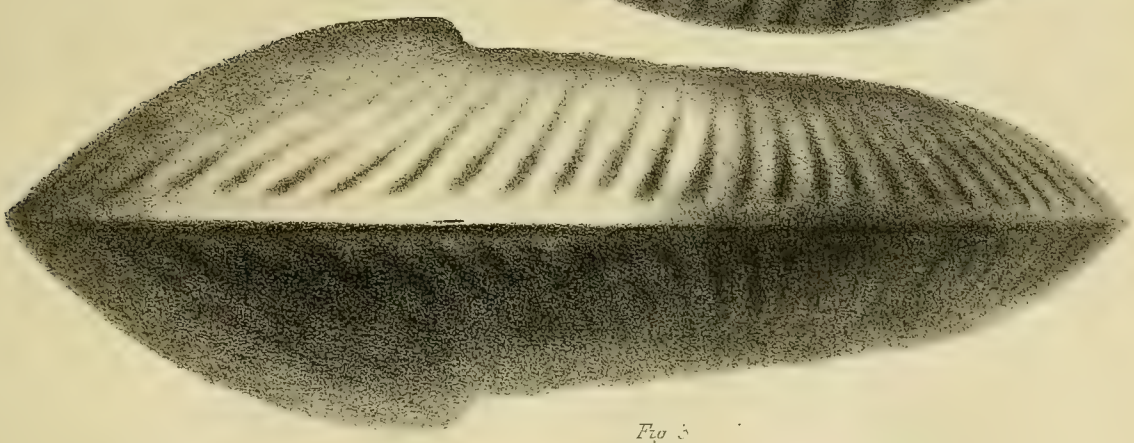
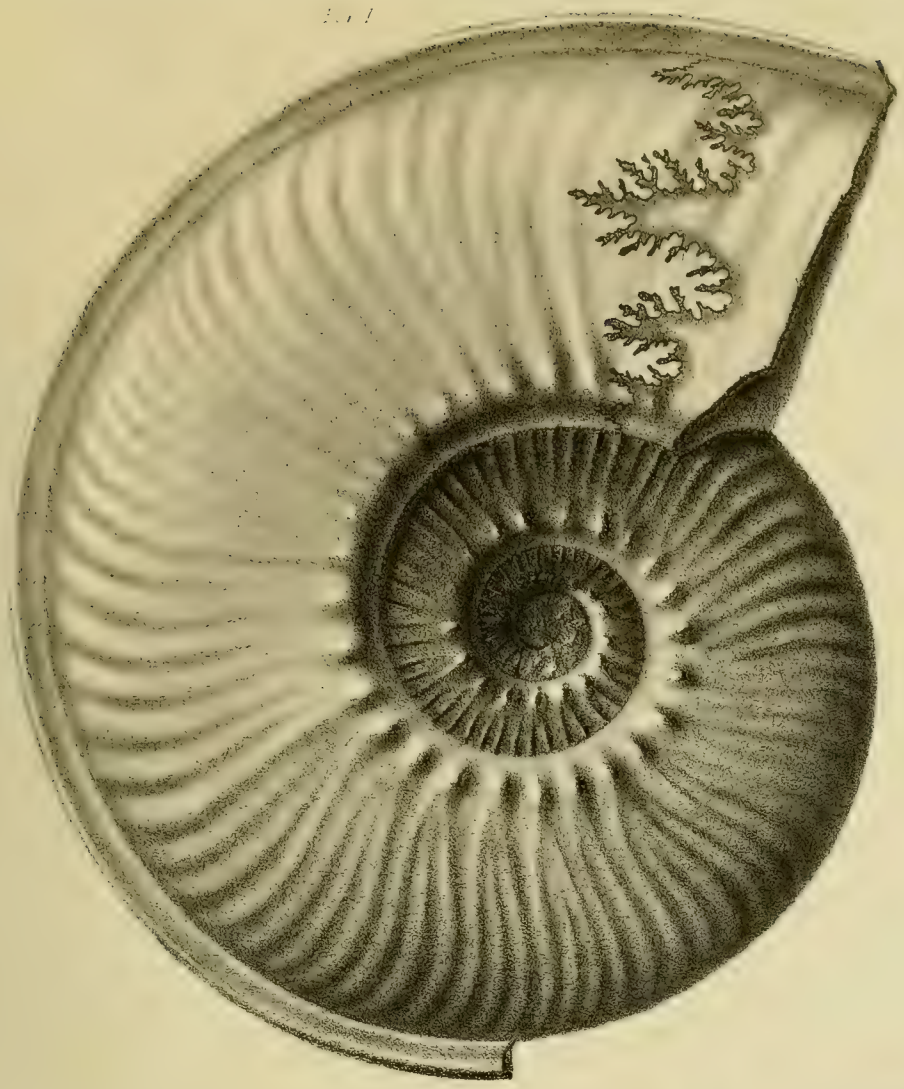


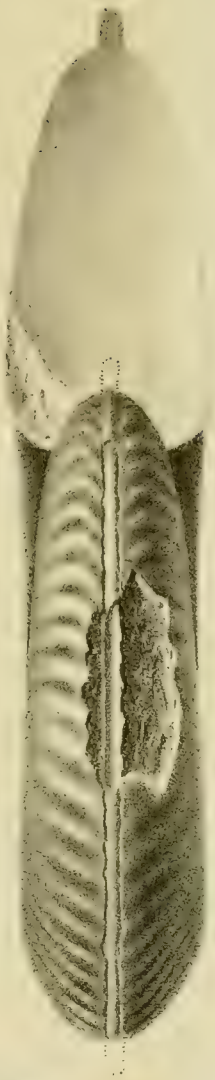
Fig 3

PLATE LXVII.

Zone of Lytoceras Jurense.

Fig. 1. HARPOCERAS VARIABILE, *d'Orbigny*. Side view, natural size. My collection.
2. — — — Front view, showing siphuncle, do.
3—6. — — — Different forms of varieties of the species, do. My collection.





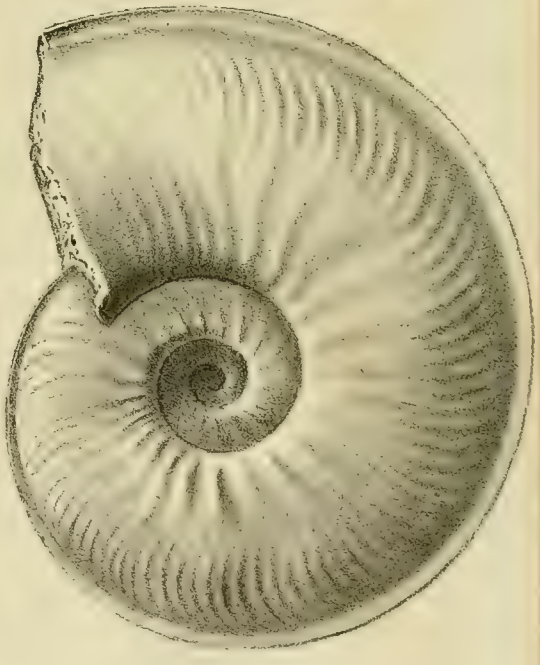


Fig 5

Fig 6

Fig 4

Fig 3

PLATE LXVIII.

Zone of Lytoceras Jurense.

Fig. 1. HARPOCERAS VARIABILE, *d'Orbigny*. Grand specimen, natural size. My collection.

Fig. 1

A.Gawan del et lith

PLATE LXIX.

Zone of Aegoceras Henleyi.

Fig. 1. LYTOCERAS LINEATUM. Side, natural size. My collection.

Zone of Aegoceras Ibex.

2. AEGOCERAS VALDANI, *d'Orbigny.* Side view, natural size. My collection.
3. — — — Back view, do.
4. — — — Lobe-line, magnified.

Zone of Aegoceras Jamesoni.

5. — PETTOS, *Quenstedt.* Side view, natural size. My collection.
6. — — — Siphonal area and lobe-line, do.

Fig 1

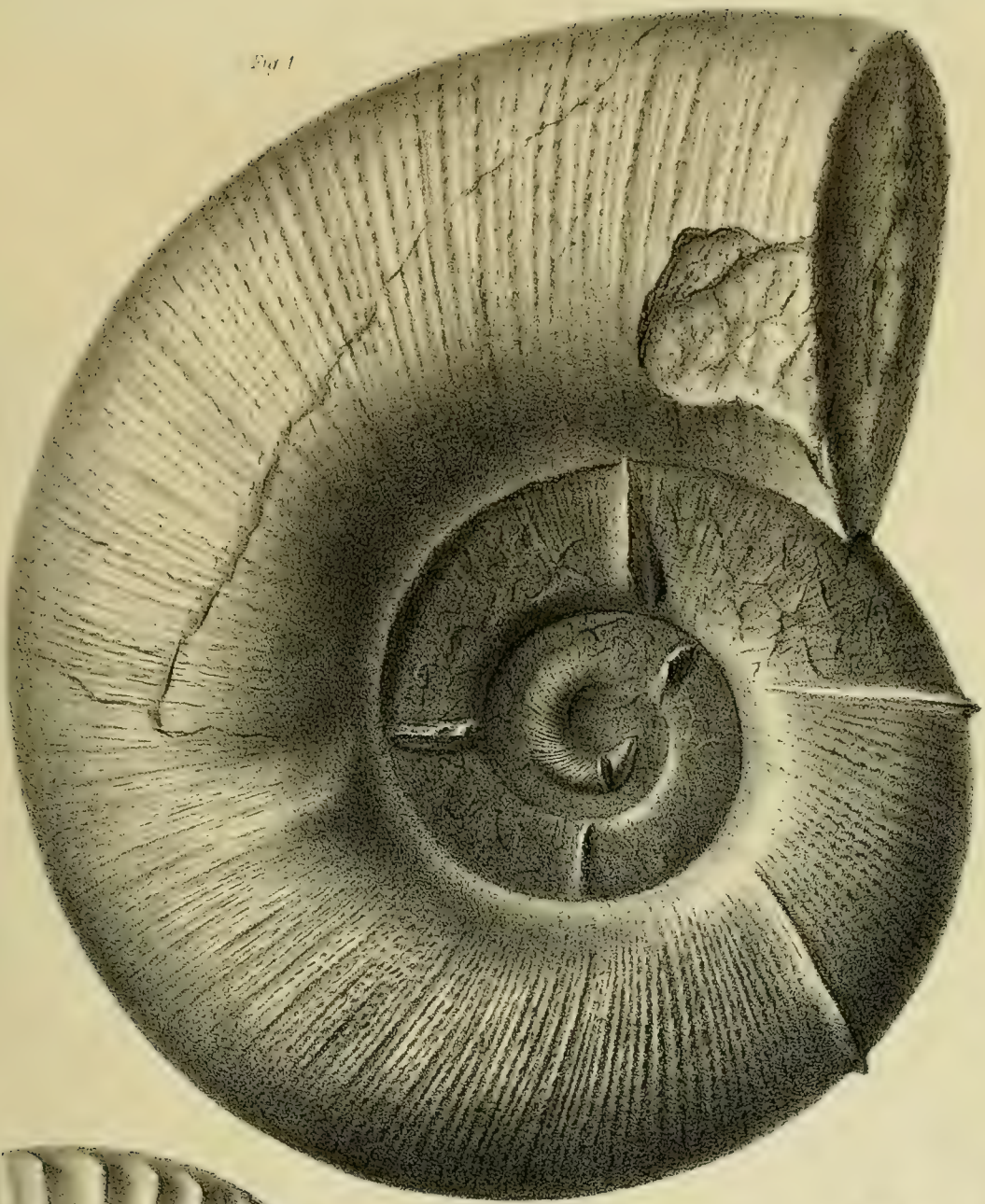


Fig 2

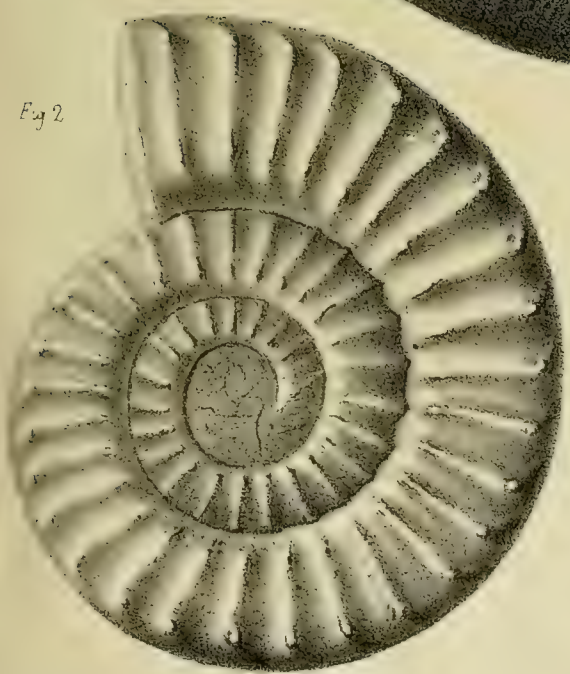


Fig 5

Fig 6

Fig 4

Fig 3

A Gawan del. et lith

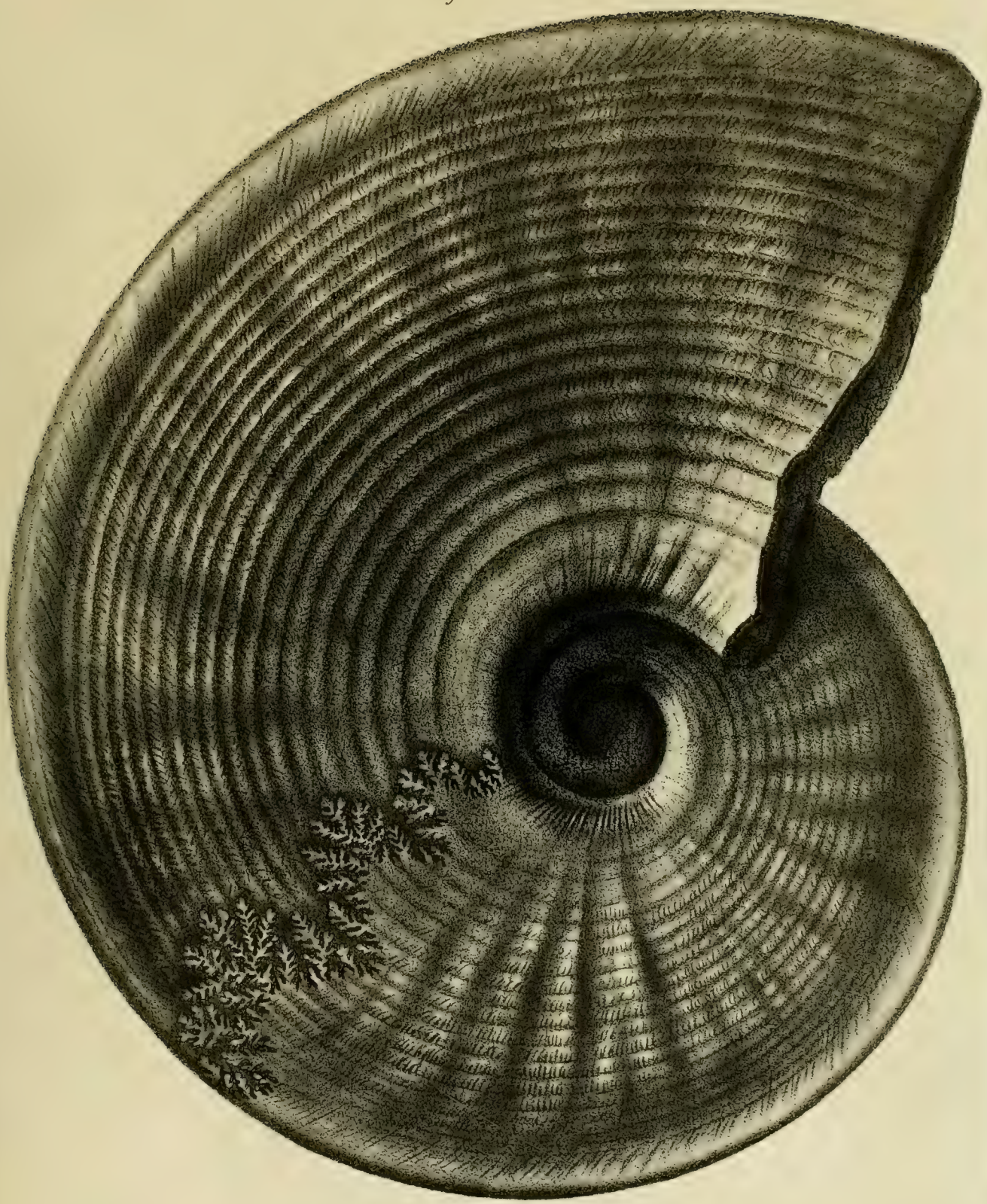
Hanhart. imp.

PLATE LXX.

Zone of Amaltheus margaritatus.

Fig. 1. Amaltheus Engelhardti, *d'Orbigny*. Side view, natural size. My collection.

Fig. 1



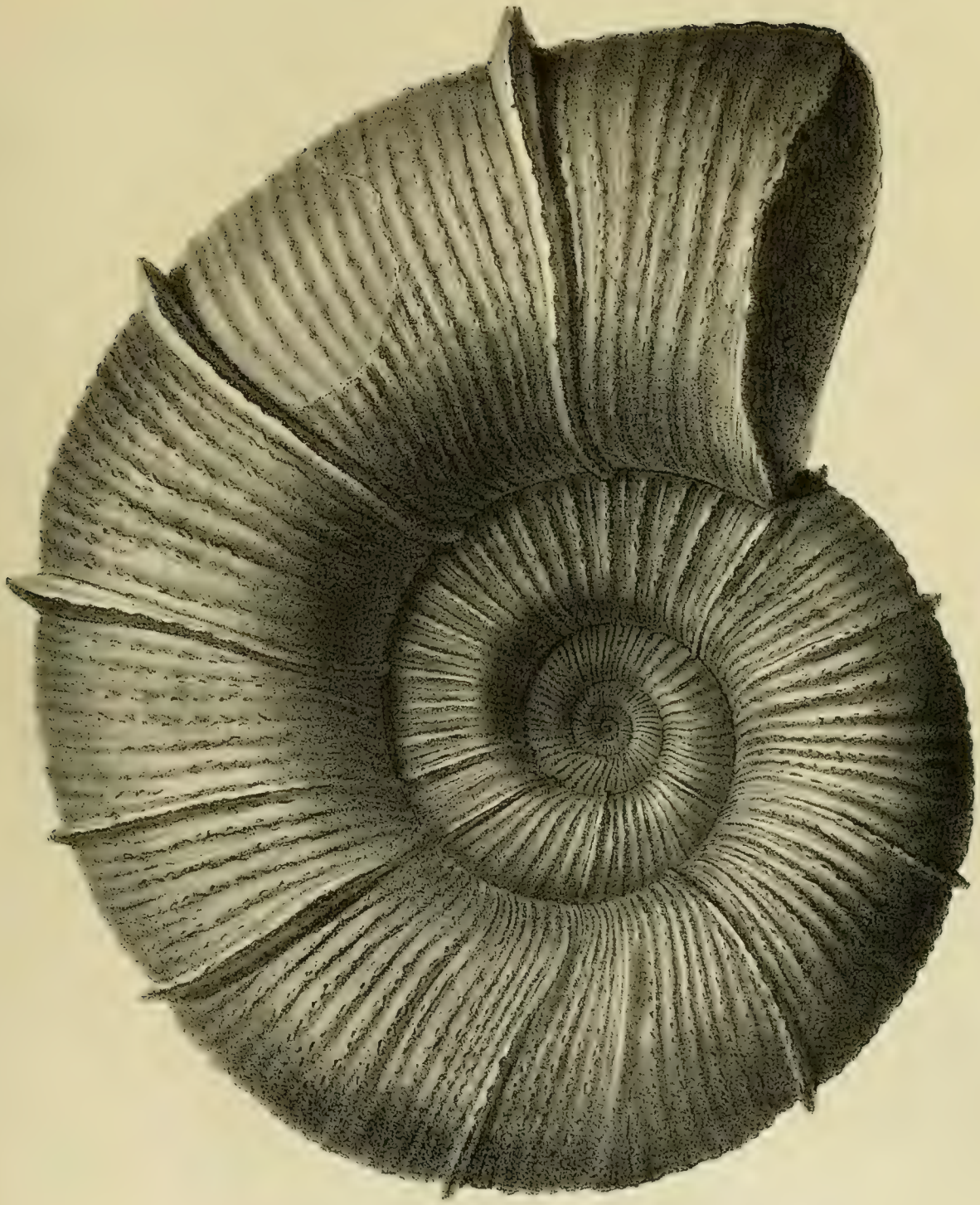
A Gawan del et lith.

PLATE LXXI.

Zone of Amaltheus margaritatus.

Fig. 1. LYTOCERAS FIMBRIATUM, *Sowerby*. Side view, natural size. My collection.

Fig 1



A.Gawan.del.et lith.

Hanhart.imp.

PLATE LXXII.

Zone of Amaltheus margaritatus.

Fig. 1. Lytoceras fimbriatum, *Sowerby.* Lateral view, natural size, showing radii and fimbriæ. My collection.

2. — — — Front view showing aperture.

3. — — — Abdominal view, siphonal area, radii and fimbriæ natural size.

4. — — — Accurate delineation of the complicated suture line, magnified.

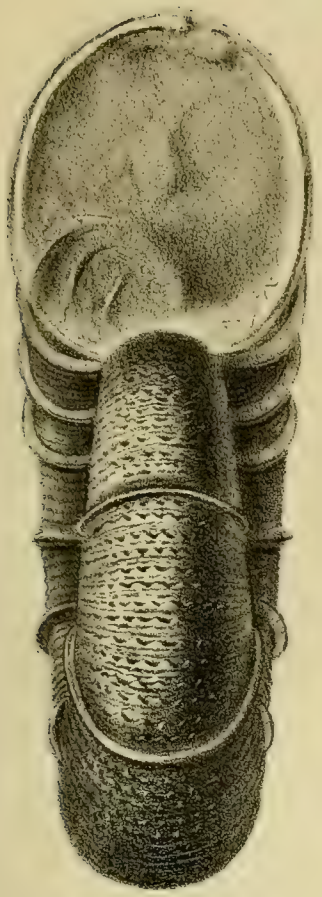
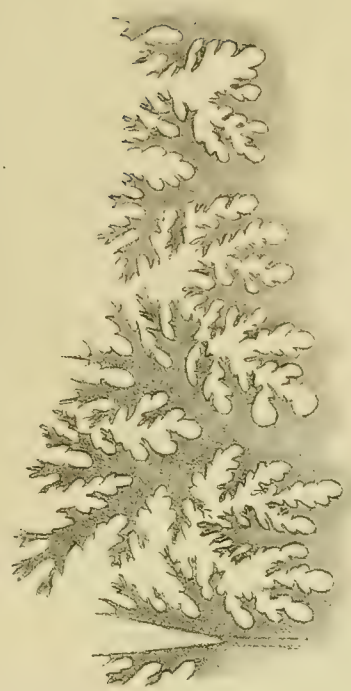


Fig. 2

Fig. 4



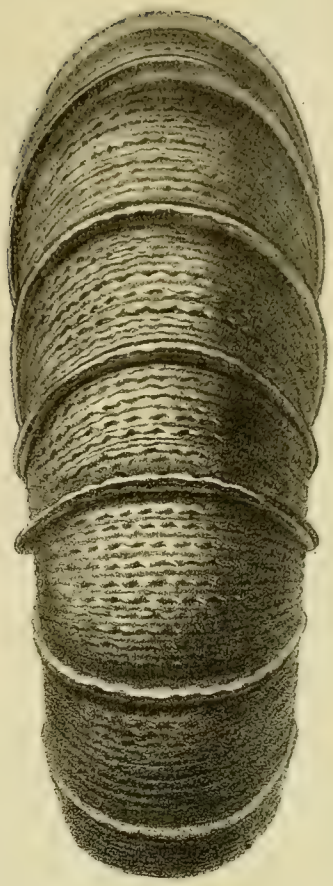


Fig 3.

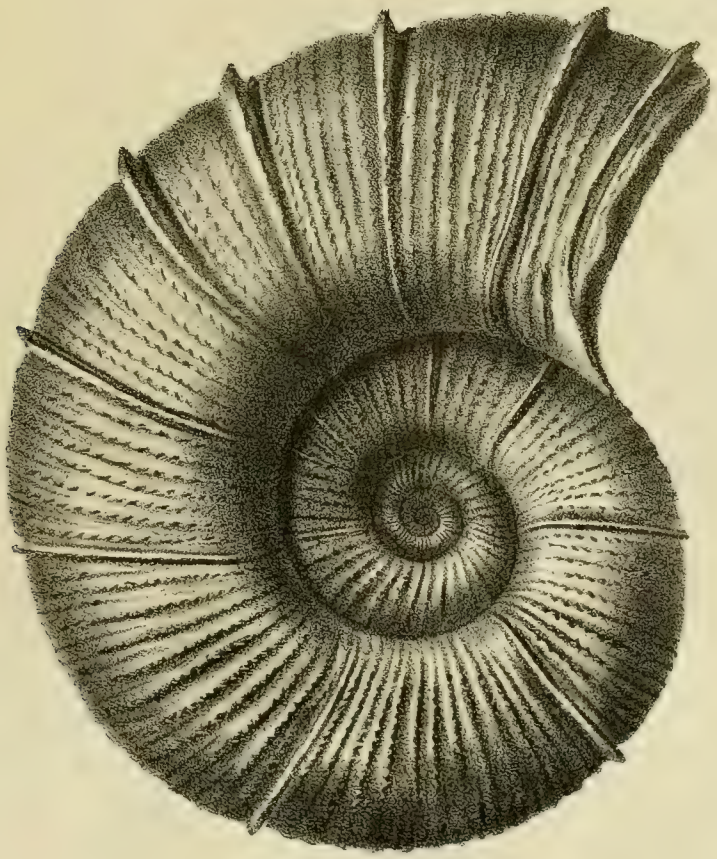


Fig. 1.

PLATE LXXIII.

Zone of Harpoceras bifrons.

Fig. 1. LYTOCERAS CORNUCOPIA, *Young*. Side view, one half natural size. Geneva Museum.

2. — — — Front view showing siphonal area and aperture.

3. — — — Suture line showing extreme complication, magnified.

Fig. 1

Fig 2

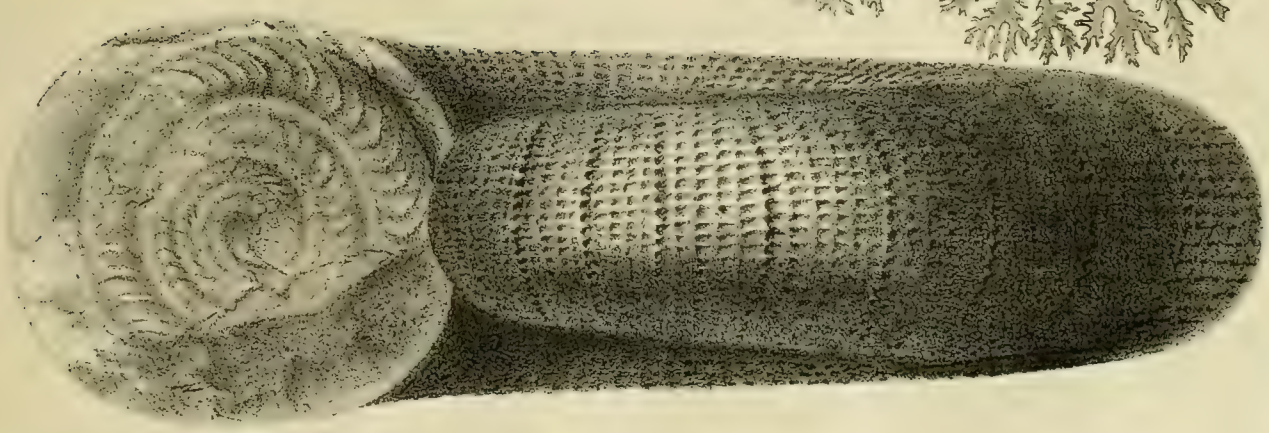


PLATE LXXIV.

Zone of Lytoceras Jurense.

Fig. 1. Harpoceras radians, *Reinecke.* Side view, natural size. My collection.
2. — — — Front view, showing carina, siphonal area, and aperture.
3. Lytoceras Jurense, *Zieten.* Side view, natural size. My collection.
4. — — — Front view of same.
5. — — — Abdominal view of same.

Fig 1

Fig 2

Fig. 4

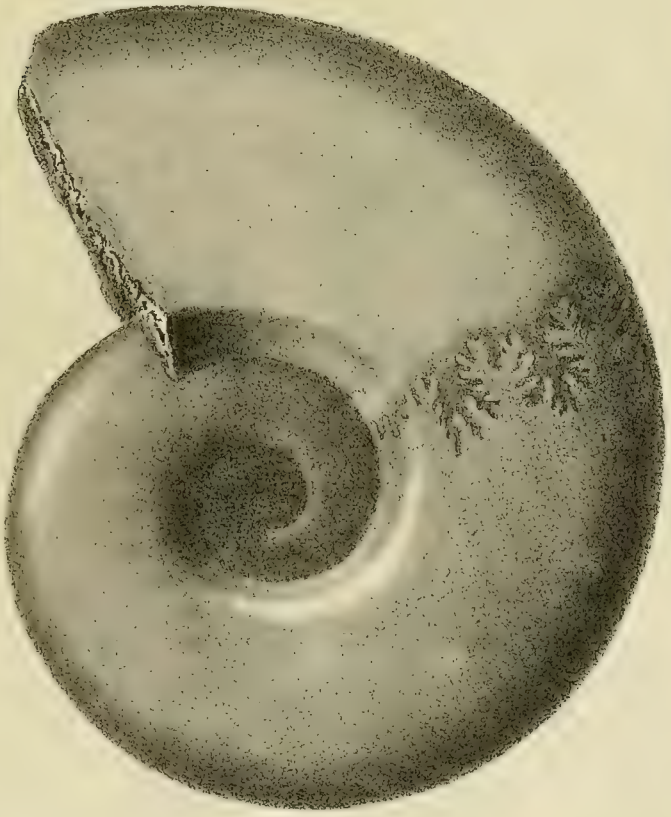


Fig. 3

Fig 5

A.Gawan del.et lith

PLATE LXXV.

Zone of Lytoceras Jurense.

Fig. 1. HARPOCERAS INSIGNE, *Schübler.* Abnormal young form, side view, natural size. My collection.

2. — — — Front view of same fossil.

3. — — — Abdominal view of do.

4. LYTOCERAS HIRCINUM, *Schlotheim.* Side view, natural size. School of Mines Museum.

5. — — — Abdominal view of same. do.

6. — — — Lateral view of another specimen, natural size. My collection.

7. — — — do. variety do. do.

8. HARPOCERAS AALENSE, *Zieten.* Lateral view, showing entire side processes to the aperture. Prof. Waagen's collection.

9. — — — Side view with prominent folds, natural size. My collection.

10. — — — do. do. Shell and position of suture line, natural size.

Fig 3

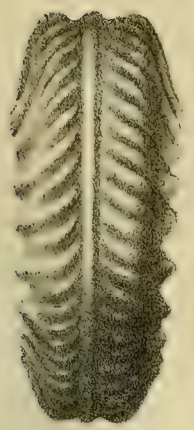


Fig. 1

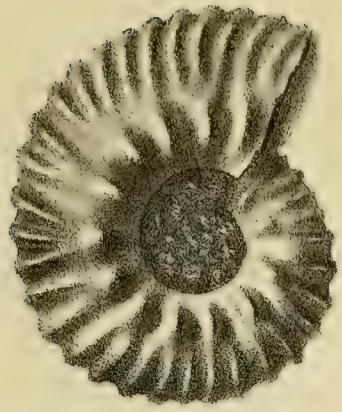


Fig. 2

Fig 5

Fig. 4

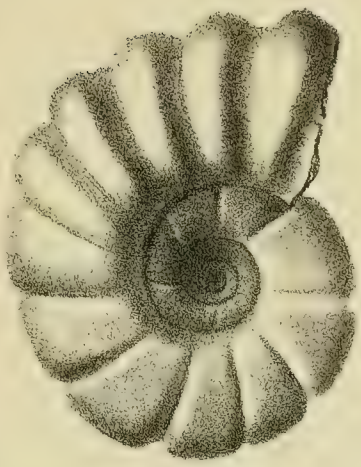


Fig 6

Fig 7

Fig 8

Fig 9

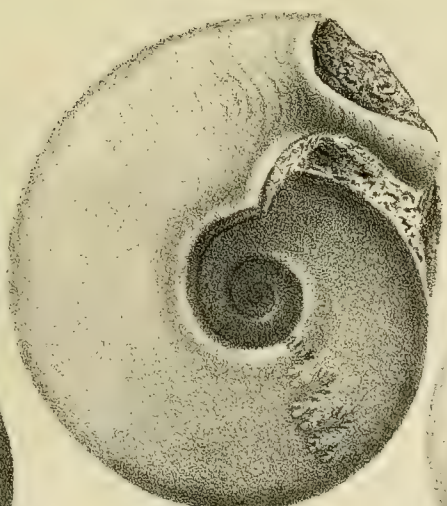


Fig 10

PLATE LXXVI.

Fig. 1. PHYLLOCERAS BUVIGNIERI, *d'Orbigny*. Side view, natural size. Belfast Museum.
2. — — — Siphonal area, natural size.
3. — — — Suture-line magnified.
4. LYTOCERAS TORULOSUM, *Schübler*. Fragment, natural size. My collection.
5. — — — Siphonal area showing shell and striæ. do. do.
6. — HIRCINUM, *Schlotheim*. Showing striæ and fimbriæ, natural size. My collection.

Fig 4.

Fig 6

Fig. 5.

Fig 2

Fig. 1.

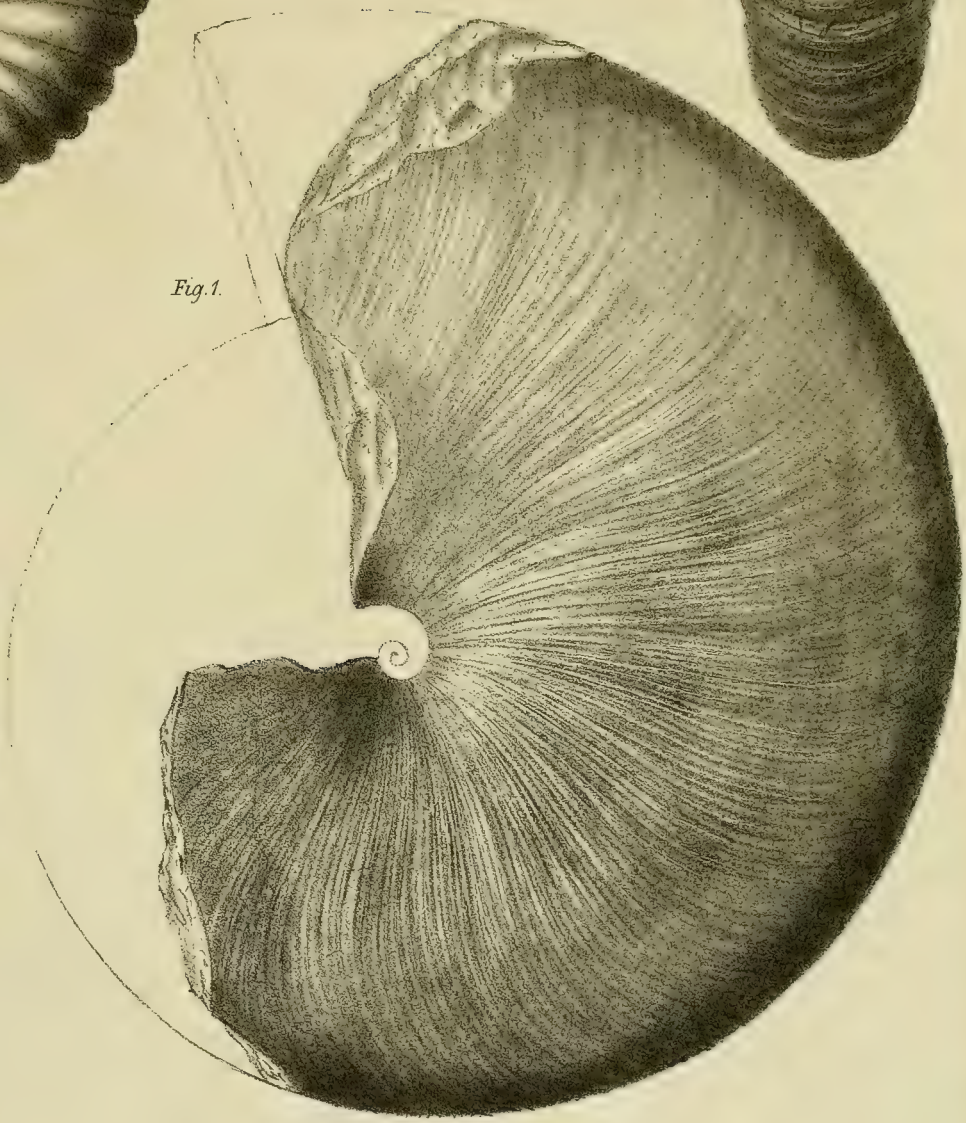
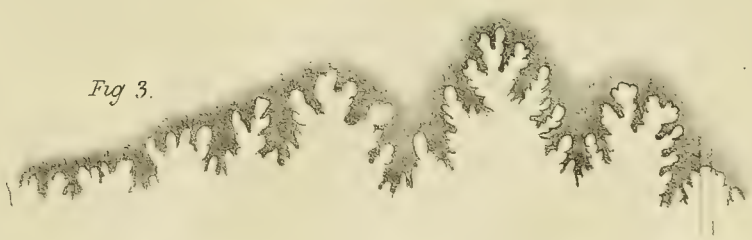


Fig 3.



A. Gawan del et lith.

Hanhart imp

PLATE LXXVII.

Fig. 1. PHYLLOCERAS ZETES, *d'Orbigny*. Side view, natural size. My collection.
2. — — — Front view, siphonal area and aperture.
3. — — — Suture-line, magnified.
4. — HETEROPHYLLUM, *Sowerby*. Suture-line magnified to compare with that of *Phylloceras Zetes*.

Fig. 1

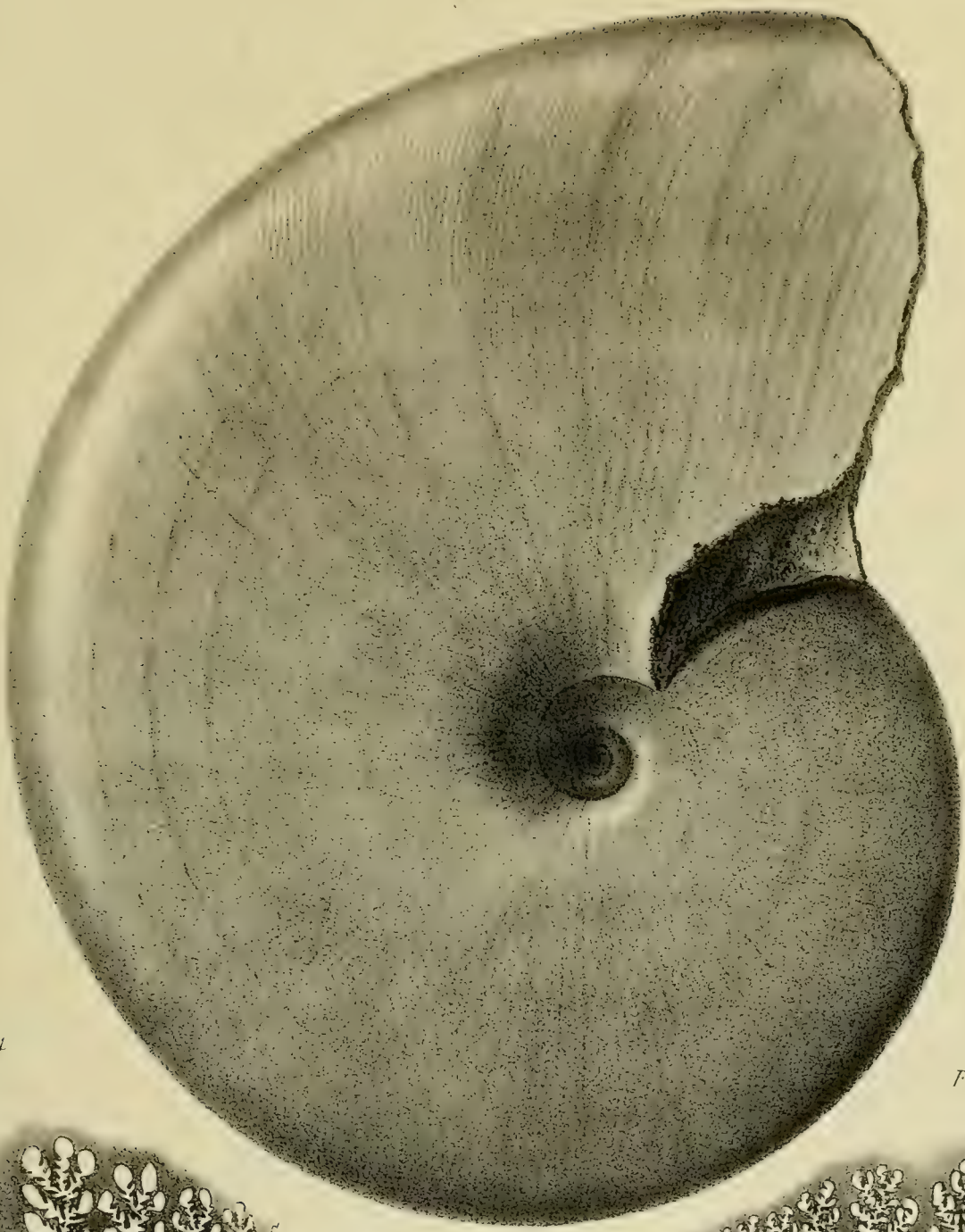


Fig 4

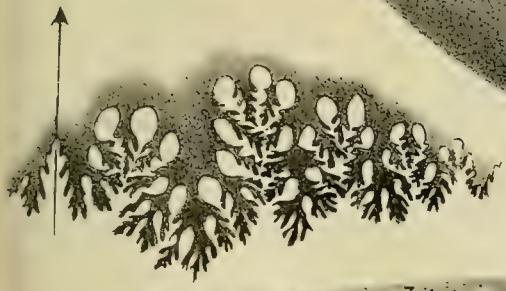


Fig 3

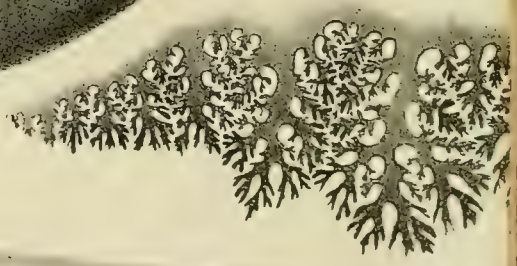


Fig 2

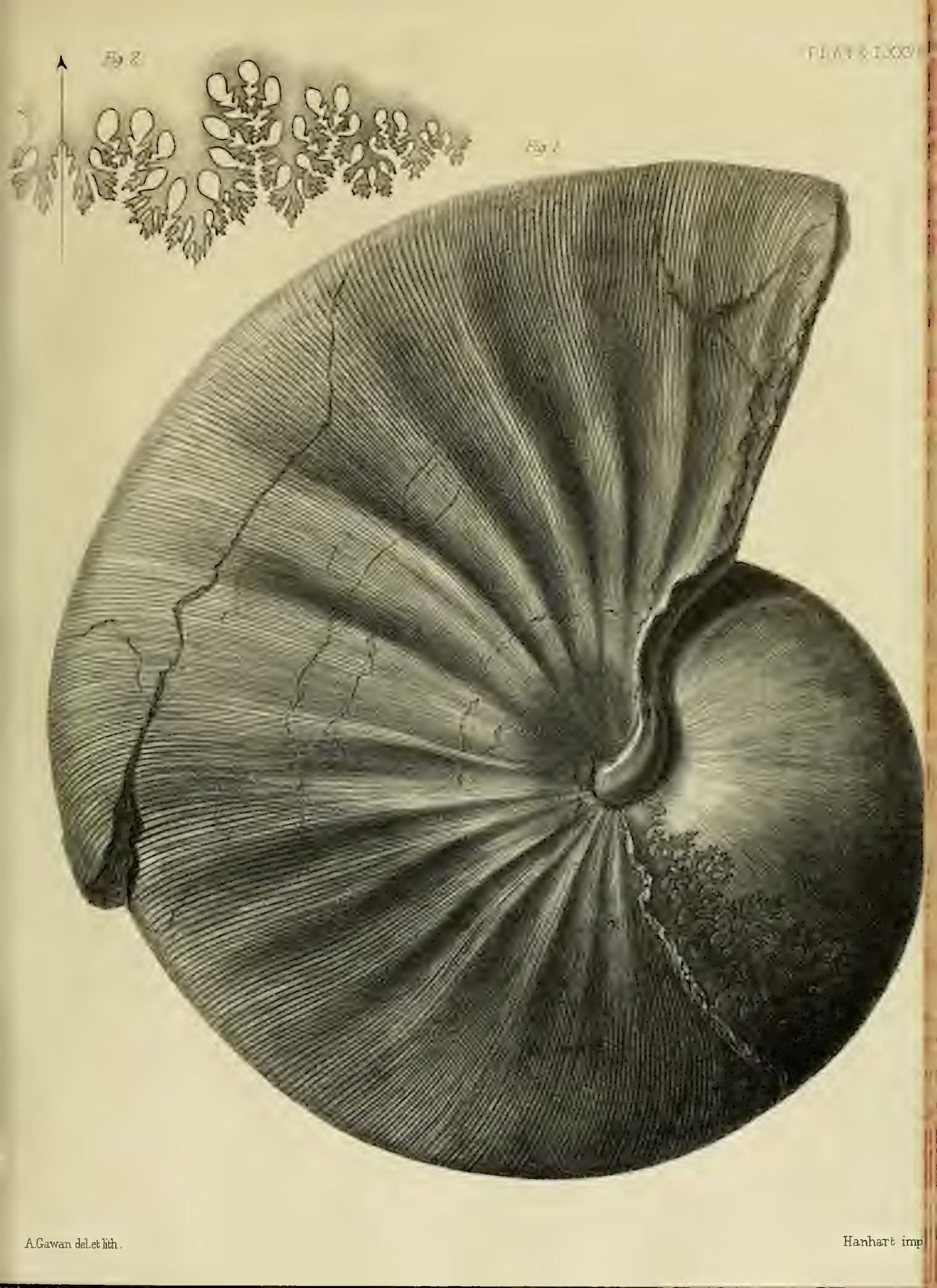
PLATE LXXVIII.

Zone of Stephanoceras commune.

Fig. 1. PHYLLOCERAS HETEROPHYLLUM, *Sowerby*. Side view, half natural size, showing the fan-like dwelling-chamber.

2. — — — Suture line magnified. British Museum.

The figured specimen was collected from the Upper Lias shales of Whitby.



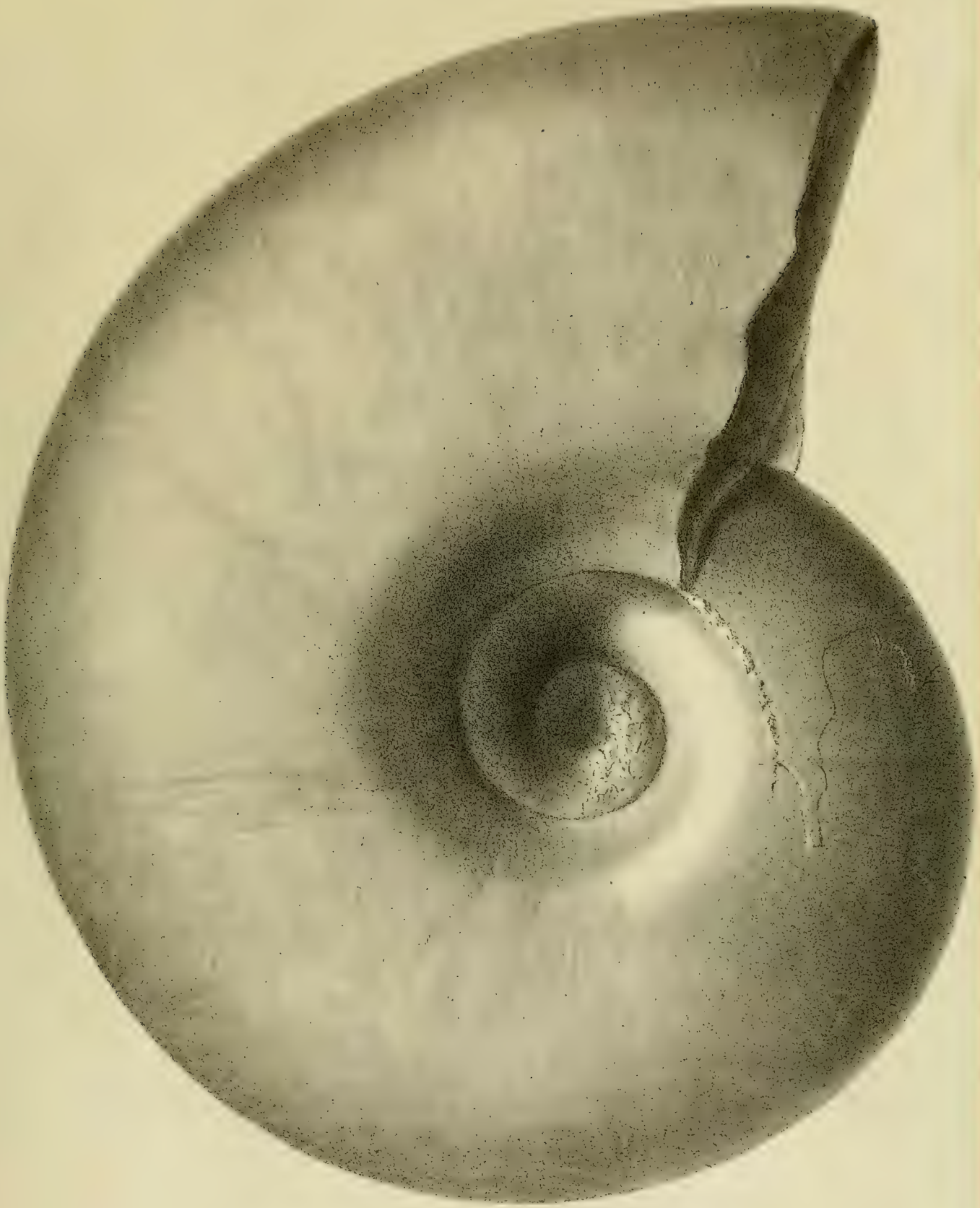
A.Gawan del.et lith.

Hanhart imp

PLATE LXXIX.

Zone of Lytoceras Jurense.

LYTOCERAS JURENSE, *Zieten.* Side view. This magnificent specimen, figured two thirds natural size, was presented to the Museum of the Royal School of Mines by the Earl of Enniskillen, D.C.L., F.R.S. The Ammonite had been sawn through to exhibit a vertical section of the septæ and chambers. There is no record of the locality from whence the fossil came, but from the petrological character of the rock I believe it was derived from the hard beds, Upper Lias, Dorsetshire.



A.Gawan del.et lith

PLATE LXXX.

Zone of Harpoceras opalinum.

Fig. 1. HARPOCERAS AALENSE, *Zieten.* Side view, natural size, with shell. Adult form, Coaley Wood. My collection.

2. — — — Front view of the same do. do.

3. — — — Suture line of do. magnified.

4. — OPALINUM, *Reinecke.* Side view, natural size. Frocester Hill. My collection.

5. — — — Suture line of do. magnified.

6. — — — Large specimen, natural size. My collection from Haresfield.

7. — — — Front view of the same, natural size.

8. — — — View of siphonal area.

Fig 1

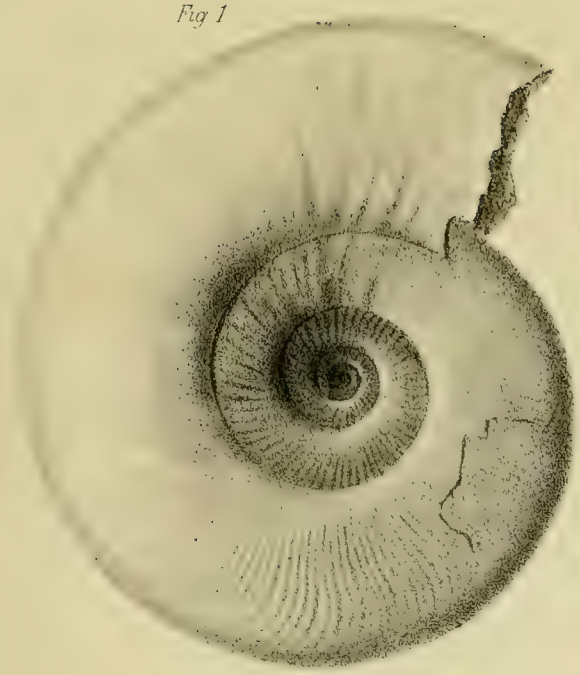


Fig 2

Fig 4

Fig.3

Fig.5

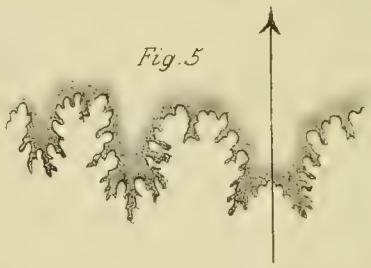
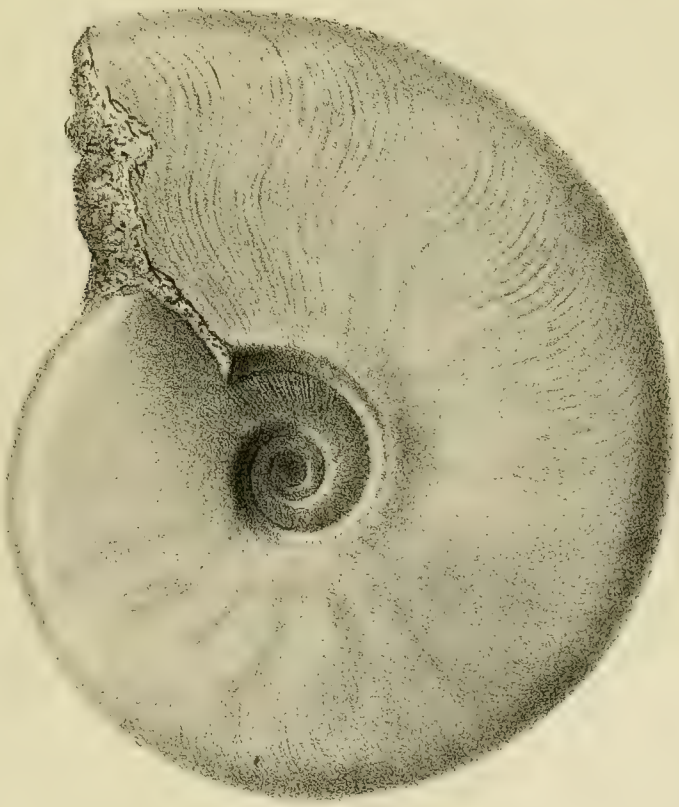


Fig.6.

Fig.7



Fig

PLATE LXXXI.

Zone of Stephanoceras commune.

Fig. 1. PHYLLOCERAS SUBCARINATUM, *Young and Bird.* Side view. Natural size, with shell preserved. Whitby. My collection.

2. — — — Front view of the same do.

3. — — — Siphonal area, with sulci and carina.

4. HARPOCERAS RADIANS, *Reinecke.* Side view, natural size. Upper Lias shale, East Brent Knoll, Somerset. My collection.

5. — — — Siphonal area and carina.

6. — — — Front view with carina and ribbing.

Fig.2.

Fig.1.

Fig 3.

Fig.5.

Fig.4.

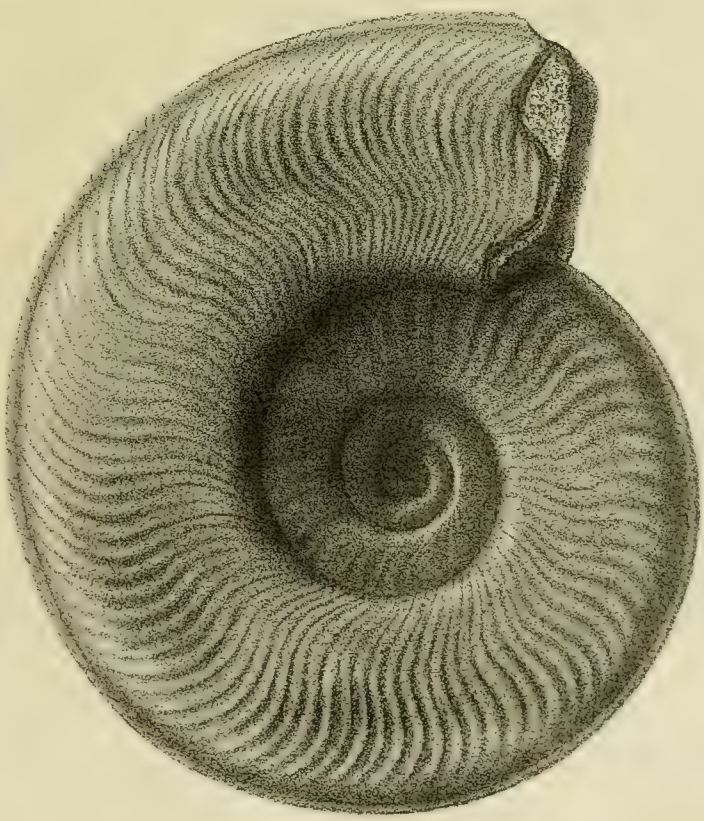


Fig.6.

PLATE LXXXII.

Zone of Lytoceras Jurense.

Fig. 1. HARPOCERAS AALENSE, *Zieten.* Side view, natural size. Lyt. Jurense Bed, Wasserelfingen, Germany. My collection.

2. — — — Front view, do. do. do.

3. — — — Side of another specimen do. do.

4. — — — Siphonal area, do. do. do.

5. — COSTULA, — Side view, natural size. Variety with coarse ribs, from my collection. Wasserelfingen.

6. — — — Variety with fine ribs, from my collection. Frocester Hill.

7. — ACUTUM, *Tate.* Side view, magnified two diameters. Chipping Warden, Northamptonshire. My collection.

8. — — — Front view, do. do.

9. — BICARINATUM, *Münster.* Side view, natural size. Coaley. Collection of Museum, School of Mines.

10. — — — Front view, do. do.

10 *a*. — — — Suture line, magnified.

11. — — — Front view of a specimen copied from d'Orbigny, 'Pal. Franc. Jurass.,' pl. 114, fig. 3.

12. — DISCOIDES, *Zieten.* Side view, natural size. Coaley. My collection.

12 *a*. — — — Suture line, highly magnified.

13. — — — Front view, natural size. My collection.

14. AMALTHEUS LENTICULARIS, *Young.* Side view, natural size. Whitby. Collection of Museum, Royal School of Mines.

15. — — — Front view, do. do.

Fig 1

Fig 2

Fig 3

Fig 4

Fig.5

Fig 6

Fig.10a

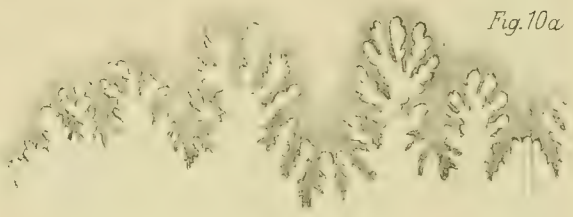


Fig 12 a

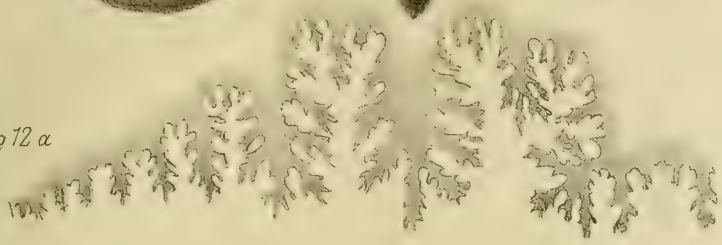


Fig. 7

Fig.8

Fig.11

Fig.10

Fig.

Fig.12

Fig.13

Fig.15

F

PLATE LXXXIII.

Fig. 1. HARPOCERAS NORMANIANUM, *d'Orbigny*. Side view. British Museum.
2. — — — Front view.
3. STEPHANOCERAS COMMUNE, *Sowerby*. Side view. British Museum.
4. — — — Front view.

Fig. 1.

Fig. 2.

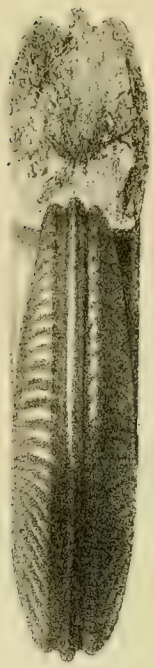
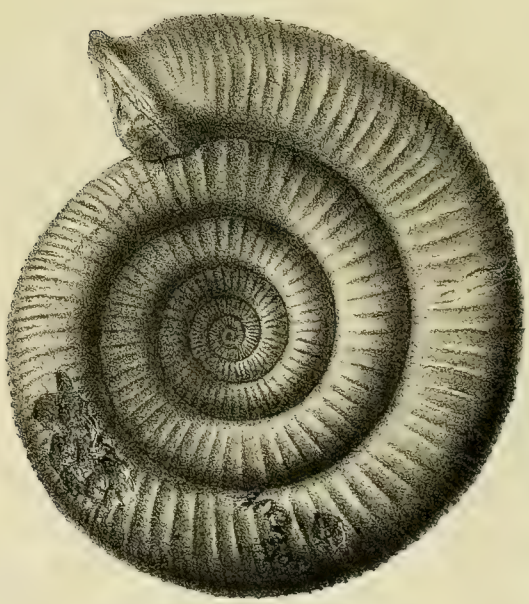


Fig 4

Fig 3



A Gawan lith

Hanhart imp

PLATE LXXXIV.

Fig. 1. STEPHANOCERAS COMMUNE, *Sowerby*. Side view, natural size. My collection.

2. — — — Front view of the same shell.

3. — — — Suture line highly magnified.

4. HARPOCERAS STRIATULUM, — Side view, natural size. My collection. Collected by myself from the "*Lytoceras Jurense* zone," Peak.

5. — — — Side view, natural size. My collection. Collected from the "*Lytoceras Jurense* zone" at Frocester Hill.

6. — — — Siphonal area, showing keel and costæ. My collection.

7. STEPHANOCERAS ANNULATUM, — Side view, natural size. My collection.

8. — — — Front view of same shell, with oral aperture.

9. — — — Portion of the suture line magnified.

Fig 1

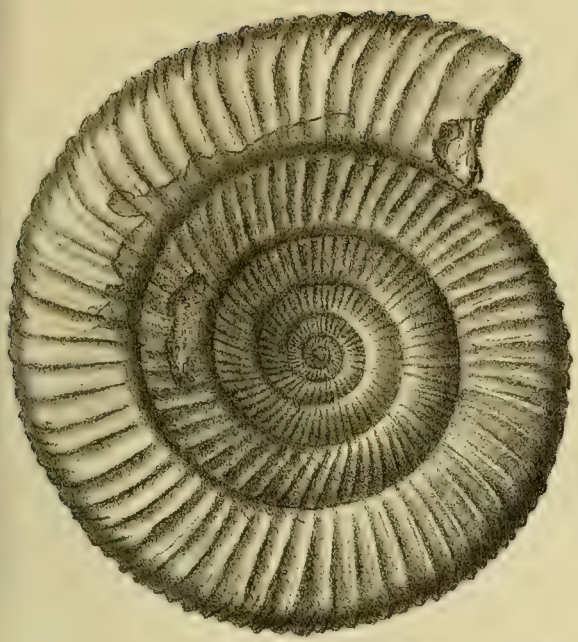


Fig 3

Fig 2

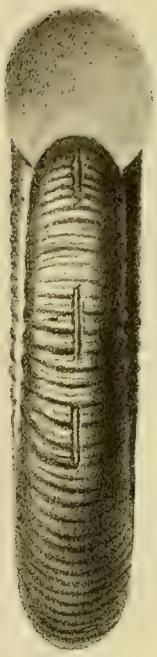


Fig 4

Fig 6

Fig 7

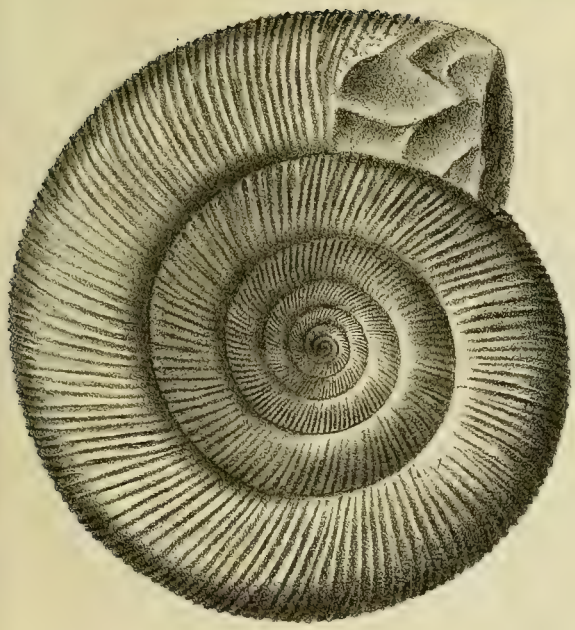


Fig 8

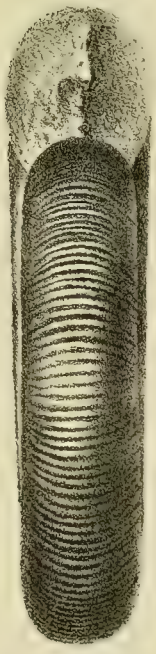


Fig 10

PLATE LXXXV.

Zone of Stephanoceras commune.

Fig. 1. STEPHANOCERAS SUBARMATUM, *Young.* Side view of a variety from Whitby, exhibiting the close relationship existing between this species and some varieties of *Stephanoceras fibulatum*. Natural size. My collection.

2. — — — Side view, natural size, from Upper Lias of Chipping Warden, Northamptonshire, showing the spinous inner whorls, and the smooth, bifurcate costæ of the outer whorl.

3. — — — Siphonal area of same shell, displaying its breadth and costation.

4. — — — Suture magnified.

5. STEPHANOCERAS FIBULATUM, *Sowerby.* Large inornate shell, side view, showing the oral aperture. My collection.

6. — — — Siphonal area and apertural expansion of same specimen.

7. — — — Side view of another example, showing very well the "button and loop" style of costation so characteristic of the species.

8. — — — Side view of the variety termed *Andreæ*.

9. — — — Portion of side of a rotund variety whose costæ are sharp, and possess pointed spines unfibulated.

10. — — — Siphonal area of a specimen collected from the Upper Lias of the Dowdeswell Tunnel, showing tubercles and transverse costæ.

11. — — — Side view of a specimen from same bed and locality. The fossil is identical with *Am. Bollensis* of Quenstedt.

Fig. 1.

Fig. 4.

Fig. 5

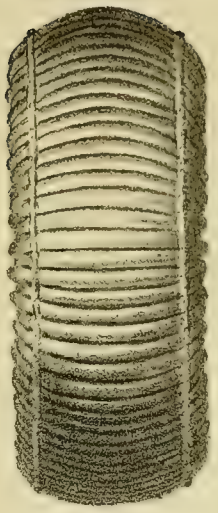


Fig. 3

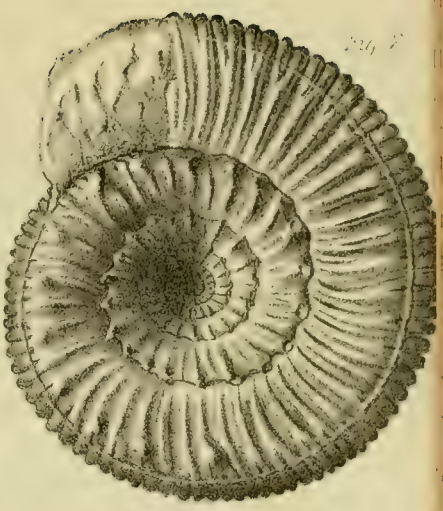


Fig. 6.

Fig. 2

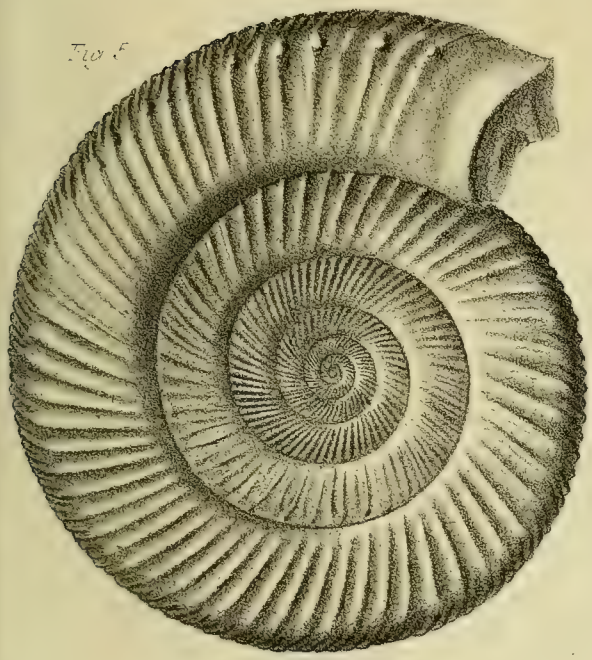


Fig. 7

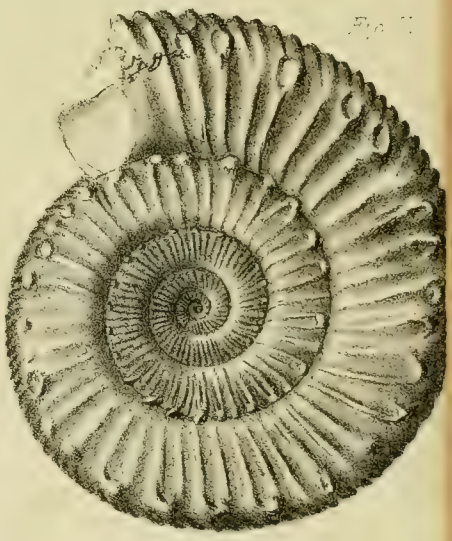


Fig. 10

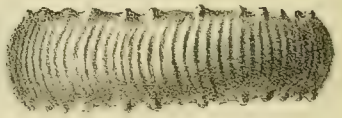


Fig. 8.

Fig 9.

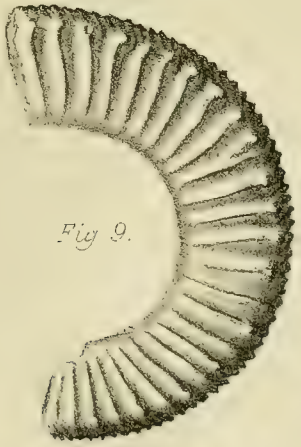


Fig. 11

PLATE LXXXVI.

Zone of Stephanoceras commune.

Fig. 1. STEPHANOCERAS CRASSUM, *Young*. Side view, natural size. Whitby. My collection.

2. — — — Front view siphonal area and oral aperture.

3. — BRAUNIANUM, *d'Orbigny*. View of siphonal area magnified two and a half diameters. My collection.

4. — — — Side view of same shell, showing tubercles and costation magnified two and a half diameters.

5. — RAQUINIANUM, — Siphonal area magnified two diameters, with suture line *in sitû*. Nailsworth. Upper Lias Sands. My collection.

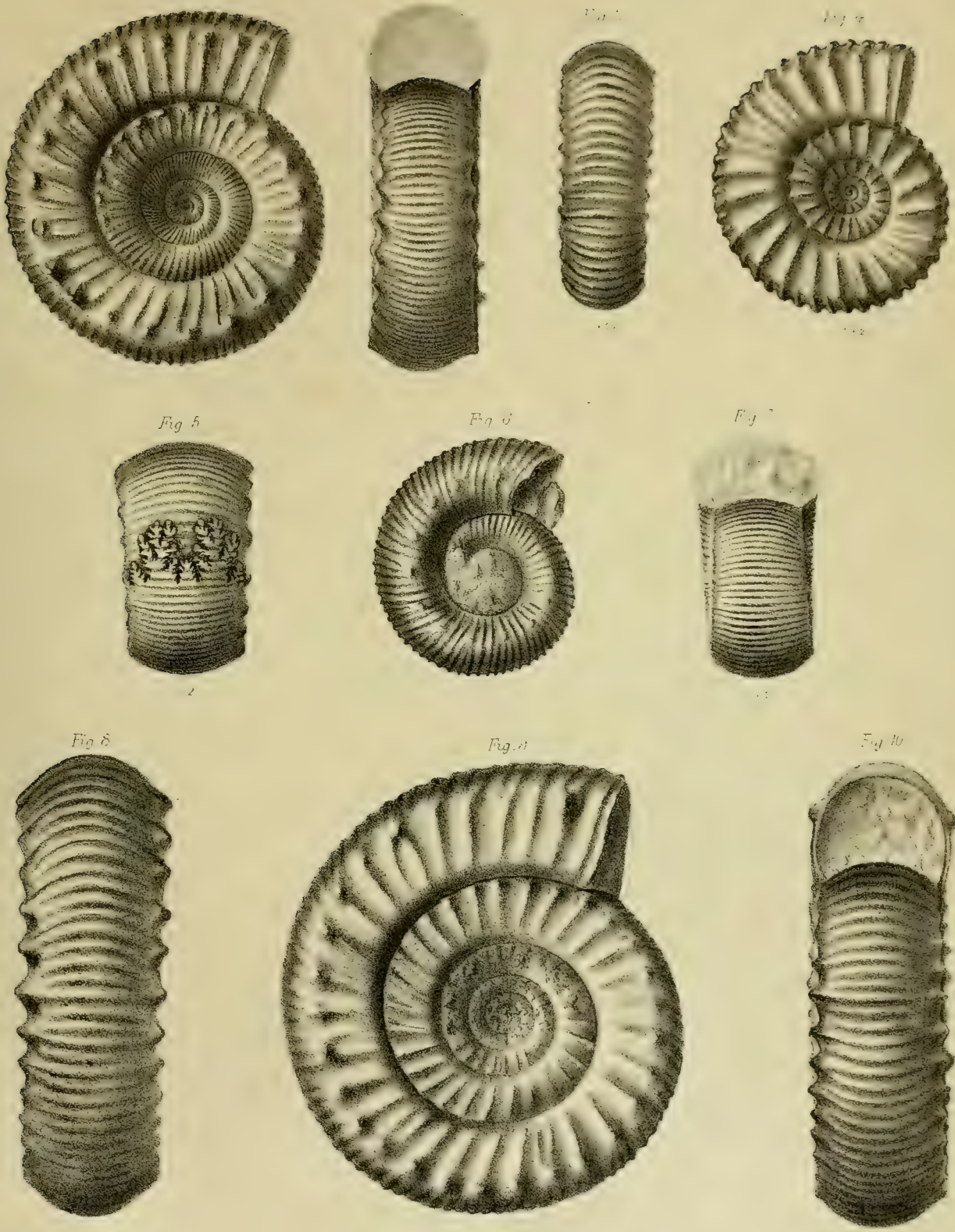
6. — — — Side view of the same fossil, showing the position of the tubercles and lateral costæ; two diameters.

7. — — — Front view of the same, showing regular transverse costæ.

8. — CRASSUM, *Young*. Large, well-developed specimen showing siphonal area, thick transverse costæ, and lateral tubercles *in sitû*. Whitby. My collection.

9. — — — Lateral view of the same fossil, showing the strong costæ and thick whorls.

10. — — — Front view of the same shell, showing transverse costæ and oral aperture.



A.Cawan del et lith.

Mintern Bros. imp

PLATE LXXXVII.

Zone of Stephanoceras commune.

Fig. 1. STEPHANOCERAS RAQUINIANUM, *d'Orbigny.* Natural size, showing the siphonal area and transverse costæ. Stinchcombe. Upper Lias Clay. My collection.

2. — — — Side of the same fossil, natural size.

3. — — — Front view, showing transverse costation and oral aperture.

4. — — — Wide siphonal area, natural size. Stinchcombe. Upper Lias Clay. My collection.

5. — BRAUNIANUM, — Side view, natural size. Stinchcombe. My collection.

6. — — — Siphonal area of the same shell.

7. — RAQUINIANUM, — Side view, natural size, with fine costæ and small tubercles. Stinchcombe. My collection.

8. — — — Siphonal area of the same fossil.

9. — COMMUNE, *Sowerby.* Shell preserved, natural size, from Upper Lias, Chipping Warden, Northamptonshire, where it is known as *Am. Holandrei*, d'Orbigny.

10. — — — Side view, natural size, of the same fine specimen in the collection of Mr. Edwin A. Walford, F.G.S., Banbury, who kindly communicated it for figuring in this work.

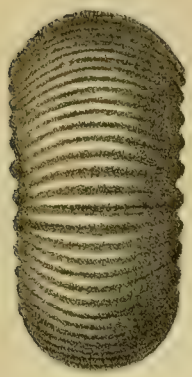


Fig. 3

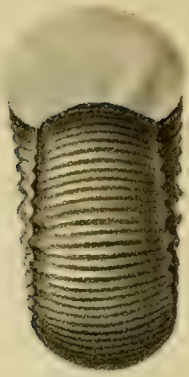


Fig. 4.

Fig. 5.

Fig. 6

Fig. 7.

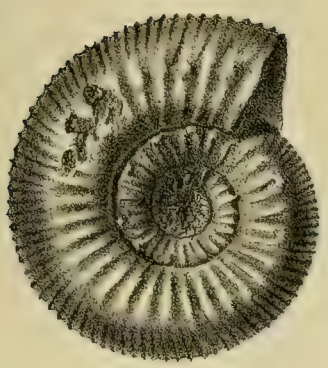


Fig. 8.

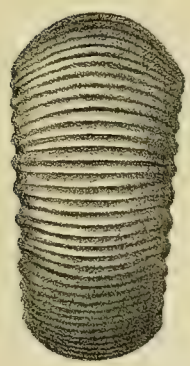


Fig. 9.

Fig. 10.

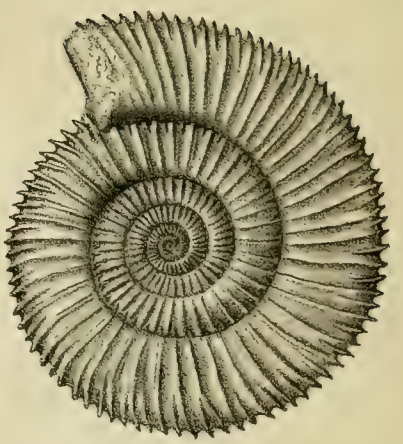


PLATE LXXXVIII.

Fig. 1. Aptychus. From the Inferior Oolite of Leckhampton Hill, of unusual size. Probably belonging to *Cosmoceras Parkinsoni*. My collection.

2. Anaptychus. Belonging to *Arietites stellaris*. Lower Lias of Charmouth. My collection.

3. — Perhaps belonging to *Arietites Conybeari*. Locality unknown. British Museum.

4. — Locality unknown. British Museum.

Fig. 1

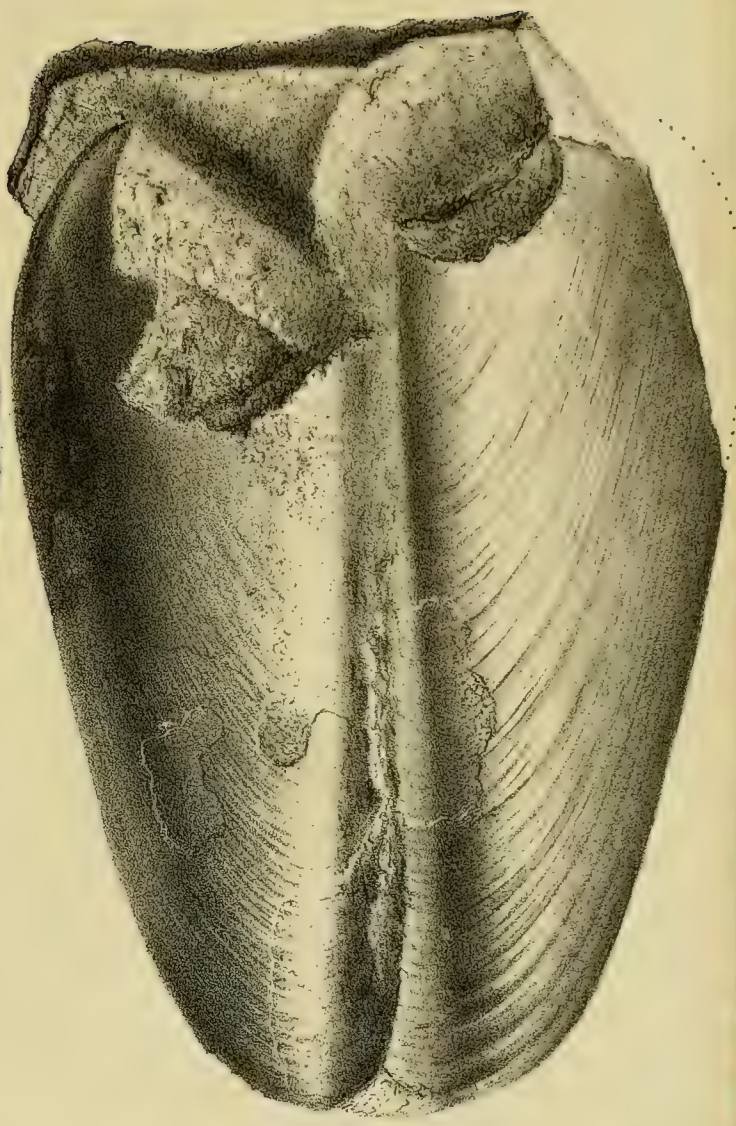


Fig. 2.

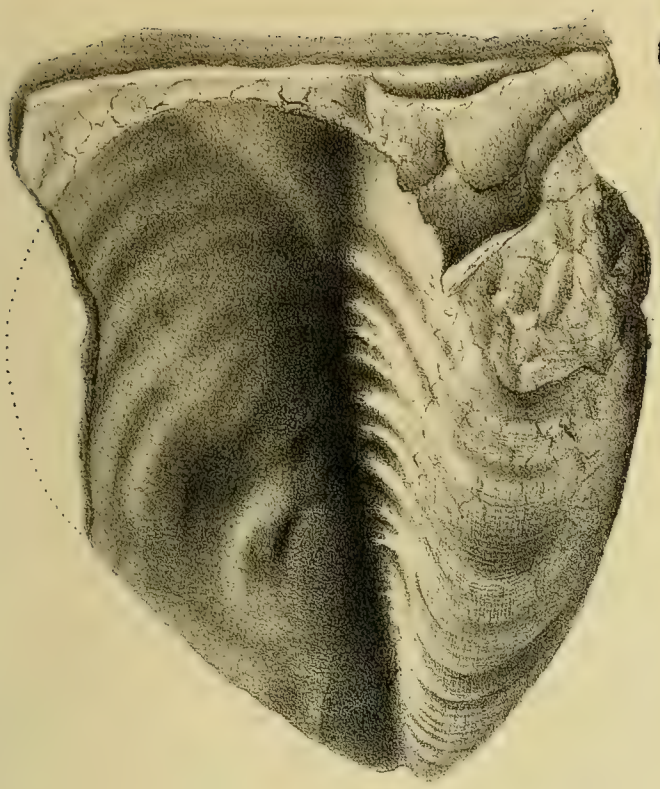
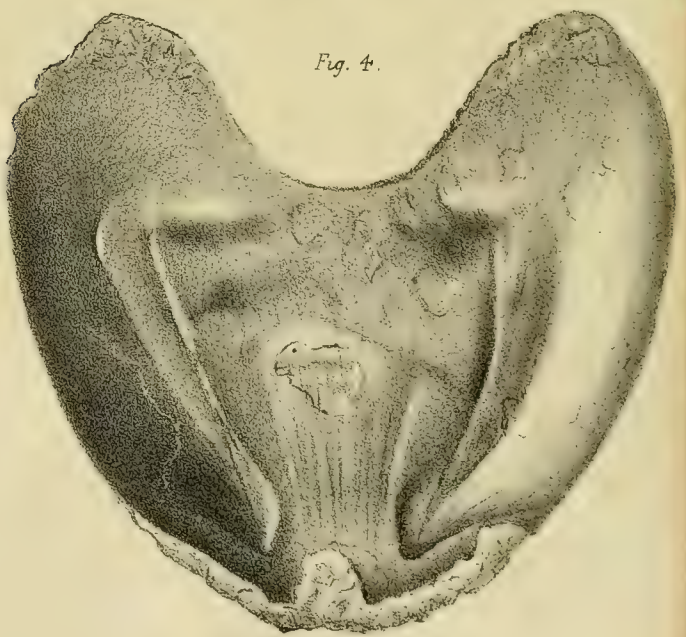


Fig 3.

Fig. 4.



A. Cawan lith.

Hanhart imp

SMITHSONIAN INSTITUTION LIBRARIES
3 9088 00662 4712